THE IRON TRADE REVIEW

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Russia and France Order Many Cars

And Considerable Foreign Railway Business is Pending—Pig Iron Outlook More Encouraging—Prices Tend Upward

The heavy buying of railway equipment by Russia and France, the continued heavy demand for munitions, the moderate improvement in strictly domestic demand for nearly all iron and steel products and the prospect for the development of a large amount of business of various kinds in the near future have added very materially to the decided improvement in conditions recently noted. In the case of the three leading rolled products, steel bars, plates and structural shapes, the Steel Corporation and several of the largest independent concerns have advanced quotations $1 per ton and are so well supplied with orders for the next three or four months that they are not seeking business for that period. It is also true that for delivery during the last quarter of the year, mills are extremely conservative in adding to their bookings.

Pig Iron

In the pig iron market activity has been confined largely to basic, for which some orders have been placed in the Philadelphia and Pittsburgh districts. Although the foundry iron market is very quiet at present, sellers are confident that they will soon enjoy some of the improvement which is coming to the finished material market. Merchant stacks report that specifications are going forward satisfactorily.

Machinery

As a natural result of the continued heavy demand for certain machine tools, especially lathes and screw machines, prices on these machines have again been advanced about 10 per cent and prices are now approximately 20 per cent higher than they were when war was declared. It is expected that at an early date prices on nearly all other machine tools will be advanced about 5 per cent. Wages are being advanced by machine tool manufacturers. Many plants are being operated overtime and are finding it impossible to deliver machines as rapidly as demanded by customers. Numerous concerns are figuring on going into the manufacture of shrapnel, but are finding it difficult to place orders for machinery. Domestic business not connected with the war continues to show moderate improvement. In Cincinnati, inquiries from Europe are not so numerous. This is probably due largely to the fact that all shops in that city are filled to capacity for several months, principally from plants in this country which have contracts for making munitions.

Railroad Buying

Equipment orders for Russia, aggregating from $25,000,000 to $30,000,000, are now under formal contract and additional equipment for that country is pending. The French government has ordered 3,500 cars. The American Locomotive Co. has also taken 20 locomotives for Belgium and inquiries from other foreign countries are pending. There has been very little contracting in cars and locomotives for railroads of the United States, but the Rock Island is about to order 4,000 box cars. On foreign orders, delivery at the earliest possible dates is being urged. The companies among which the recent orders were distributed are preparing to turn out the equipment as rapidly as possible.

Bars

The steel bar market is strong. Agricultural implement manufacturers who had been insisting upon being allowed to make contracts for their requirements for the year beginning July 1 have now pretty generally covered for six months. The Pennsylvania railroad, the Baldwin Locomotive Co. and other large consumers are in the market for round tonnages. Some war business is still pending.

Shapes

The most important structural contract of the week was for the Paducah & Illinois railway bridge at Metropolis, Ill., calling for 18,000 tons, awarded to the American Bridge Co. Numerous new contracts are developing in the west, but there is not much activity in eastern territory.

THE OPEN HEARTH

Brickbats and Bouquets from the Iron Country

A RECENT editorial published in these columns in regard to the Cuyuna district has brought out varied comment and has developed additional information in regard to conditions on that range. A man of high standing, who has long been identified with the Lake Superior iron ore country, writes as follows:

"You speak of the rascals and honest men on the Cuyuna. The range has been hurt by a good many stock jobbers, who have been helped in their work by the fact that the Cuyuna is in northern Minnesota, and consequently the examples of easy money made on the Mesabi have tended to give the idea that similar easy money might be made on the Cuyuna. As you say, there are a good many honest men on the Cuyuna, who have developed lands and mines in the proper way, and I am glad that you talked to two of these—Crosby and Savage. These two are not the only ones, by any means.

"In my own humble opinion, the worst graft that has been put across in these Cuyuna developments has been that based on the manganese ignis fatuus. This has been helped by the ferro situation and the advertising that high grade manganese ores have consequently received.

"Nobody, I suppose, is making any money out of low or medium grade non-bessemer ores today, especially from underground. And, knowing some things that I do as to the early advent of new competitive ores of high grade, I do not see where they are to make much for a long time. Of course, this is not any worse for the Cuyuna than it is, for example, with the Great Northern ore properties, or other non-bessemer producers.

"Speaking again about the rascals on the Cuyuna, of whom you wrote, I doubt if most of those who have gone wrong there have done so intentionally. I think a good many of them have made their errors through ignorance. I think much of the manganese rot has been because they did not know any better and were misled by outsiders who claimed to know but maybe didn't. Still, I guess you are right in saying that there have been rascals on the range. Even churches and trade journals—perish the thought—have had their thieves."

Carl Zapffe, a geologist of Brainerd, Minn., writes as follows:

"Regarding your article on the Cuyuna district in your issue of May 27. I want to compliment you on the article and am pleased to see the position you have taken. Several times, in the past, you have had brief articles or notices about the Cuyuna which I felt were very bad ones to publish. I have been in close touch with the local situation almost since the beginning of the district, and am thoroughly familiar with nearly everything that has been done here and that has been said about any property. I felt that some of your earlier articles were not of the kind that would appeal to the big majority of those who, I think, would constitute your list of subscribers. Your recent article was reproduced in full in our local daily."

The earlier articles to which Mr. Zapffe refers were intended to expose the false claims being made in regard to certain mines alleged to contain manganese ore or manganiferous ores. A later editorial referred to the sound propositions as well as the others. It was not, however, specific as to some properties and we wish now to add the following facts as to operations of trustworthy concerns:

The Inland Steel Co. is mining about 1,000 tons per day at Armour No. 2 and has shipped the bulk of its large stockpile. The Thompson mine of this company is loading some ore in its pit that it encounters in stripping and in getting the pit ready for the summer's work. A log washing plant of one unit is nearly complete. This will take care of the small tonnage of wash ore that exists in the Thompson pit. The Thompson underground mine is idle.

Armour No. 1 underground is idle, but the ore adjoining the Pennington pit is being stripped by the Pennington people. This will give the Inland close to 1,000,000 tons of open pit ore. The Tod-Stambaugh Co. will be able to extend its tracks into the Armour No. 1 and vice versa, thus increasing the tonnage of steam shovel ore. The Pennington plans to ship 100,000 tons this year.

The Hillcrest mine of the Hill Mines Co. has been stripping with a sand pump for several weeks and has already washed away a considerable quantity of overburden. This mine might ship a little this fall, but probably will not until next year.

The Kennedy mine of the Rogers-Brown Ore Co. is mining about 1,000 tons per day, hoisting by day shift only. The Meacham mine at Crosby is idle.

The Rowe mine of the Pittsburgh Steel Co. is at present the largest operation on the Cuyuna range. The company has two shovels stripping and is also doing a good deal of work with a sand pump. The washing plant is about half completed and should be ready by Aug. 1 surely. It now has uncovered and cleaned up a large area of ore. There is much speculation as to the outcome of this large attempt to wash ore, but the management of the property seems to be in the hands of high class men and if the information they claim they have is correct, there need be little doubt as to their ability to make this undertaking a success.

The Croft mine at Crosby of John A. Savage & Co. has its concrete shaft now dropped into the ledge several feet. The shaft is vertical and has been sunk in seven and one-half months through 105 feet of sand and water. This is the first time that any mining company in the Lake Superior district has attempted to put down a concrete drop shaft with its own men and equipment, the practice having always been to turn this work over to a large eastern contractor who works with caissons and special patents. The Croft mine could doubtless ship some ore this fall, but it will not until 1916.

Another recent editorial on The Iron Country Today, that relating to the reckless expenditures of some Minnesota iron range towns, has also brought

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varied comment to this office. Some of it is violently abusive, notably that published by a newspaper at Hibbing. This, of course, is not worthy of attention. To a class other than that of the editor of the aforesaid newspaper belongs B. O. Greening, superintendent of schools at Eveleth, who writes a polite note saying that we are in error as to the cost of the school building at Eveleth, which we stated was $250,000. Investigation shows that we were misinformed and that the exact cost of the building referred to, including the lot, was $98,858.96. We are glad to make this correction.

A reader of *The Iron Trade Review* who is not connected with any of the mining companies, but has long been an observer of events on the ranges writes, "I am glad to see that the fight is on at Hibbing. The operators have taken a great deal of punishment —too much, and for too long a time." This expresses the sentiments of many people in Minnesota who have no financial interest at stake. The Corporation particularly has been criticized for not making a more vigorous fight for its rights.

Courts Can Not Enjoin Good Will

THE action of the United States court in condemning the Gary dinners and committee meetings following the panic of 1907 naturally has suggested the query—If business men cannot meet as they did in carrying out the purposes of the so-called Gary movement, what can they do to prevent the ruinous competition of earlier days? Possibly some plan resembling the German system of government supervision of syndicates or trusts can be worked out in this country, but there is no immediate prospect of such an eventuality. In the meantime, the best that business men can hope for is that the good will generated by the Gary movement will continue to exercise a helpful influence.

Judge Gary believed that the getting together of men in the same or similar lines of business and the cultivation of the utmost frankness among competitors would have a stabilizing influence. If such meetings could be held in the future without even the suggestion of an agreement on prices, the effect would be good, if for no other reason than that as men come to know and like each other better, their belligerent tendencies decrease. Certain it is that no injunction can be granted against good will, nor can a court prevent one man from telling another what price he expects to ask for a certain product.

Until experience shows a better way, the Corporation will continue its policy of going ahead without agreement with competitors, but keeping in mind always its duty to its employes, its competitors and its customers. "We must not make the mistake," said Judge Gary, in his recent letter to the presidents of the subsidiary companies, "of supposing that under this decision we would be justified in changing the course heretofore pursued. We must not become indifferent or careless. We must positively maintain the standards of propriety which we have been following." We believe that the competitors of the Corporation will also follow the same policy of live and let live which has characterized the iron trade in recent years and all will hope that definite legal means will be devised to put the business on a more profitable basis.

Welcome to New Citizens

AS President Wilson said, in speaking at the flag day exercises in Washington, Monday, "There are no days when an American citizen should be more patriotic than on other days, for he should wear the flag in his heart always." But it is peculiarly appropriate that on the Fourth of July special attention should be given to patriotic subjects and the movement of the National Americanization Day committee to make a special effort this year to impress upon all citizens, American-born and foreign-born alike, adults and children, the duty of rallying to American ideals the purposes and common interests of many people united in one nation deserves enthusiastic support. An important part of the program in many cities of this year's Fourth of July celebration is the welcoming into citizenship of many foreign-born men who have recently received their naturalization papers. For some time past, in Cleveland, Judge John H. Clarke, of the United States court, in cooperation with patriotic citizens, has made the reception of new citizens a beautiful and impressive ceremony. This idea has now extended to many parts of the country and we commend its support to manufacturers who have in their employ many men who have recently become citizens. These men should be made to feel that their entrance into citizenship is not a trivial matter, but a very serious one, bringing with it important duties and privileges.

The tremendous importance of employers of great industries and their employes at a time of national crisis is being shown now in a highly impressive way in England. We earnestly trust that the United States will not be called upon to meet such a crisis as that through which Great Britain is now passing, but it is a matter of the highest importance for employers and employes to prepare to fulfill any duty which they might be called upon to assume if such an unfortunate condition should arise. One step in the right direction is the Americanizing of new citizens of the republic.

Prices Present and Past

Quotations on leading products June 16, average for May, 1915, average for March, 1915, and average for June, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices June 16, 1915.	Average for May, 1915.	Average for March, 1915.	Aver. for June, 1914.
Bessemer pig iron Pittsburgh..	$14.60	$14.55	$14.55	$14.90
Basic pig iron, Pittsburgh.....	13.60	13.45	13.45	13.90
No. 2 Fdy. pig iron, Pittsburgh	13.45	13.45	13.45	13.90
Northern No. 2 Fdy., Chgo....	13.00	13.00	14.25	14.25
Lake Superior Charcoal, Chgo..	15.75	15.25	15.50	15.75
Malleable, Bessemer, Chgo.....	13.00	13.00	14.25	14.25
Southern No. 2, Birmingham...	9.50	9.75	9.50	10.45
Southern Ohio No. 2, Ironton.	12.50	12.50	12.75	13.50
Basic, eastern Pa.....	13.75	13.25	13.50	14.00
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.50
No. 2X foundry, Philadelphia..	14.25	14.25	14.25	14.75
Ferro mang., Balt., (prompt)..	115.00	100.00	78.00	38.00
Billets, Pbgh.	20.00	19.50	19.50	19.75
Sheet bars, Pbgh.....	20.50	20.00	20.00	20.75
Steel bars, Chicago.....	1.39	1.39	1.38	1.28
Steel bars, Pittsburgh.....	1.20	1.20	1.15	1.115
Iron bars, Philadelphia.....	1.17	1.17	1.12	1.17
Iron bars, Cleveland, local del'y	1.20	1.20	1.15	1.20
Iron bars, Chgo. mill.....	1.15	1.15	1.17	1.10

	Prices June 16, 1915.	Average for May, 1915.	Average for March, 1915.	Aver. for June, 1914.
Beams, Chicago	$1.39	$1.34	$1.43	$1.28
Beams, Pittsburgh	1.20	1.20	1.15	1.115
Beams, Philadelphia	1.359	1.359	1.25	1.25
Tank plates, Pittsburgh.....	1.20	1.125	1.125	1.10
Tank plates, Chicago.....	1.34	1.29	1.38	1.28
Tank plates, Philadelphia.....	1.359	1.359	1.259	1.25
Sheets, blk., No. 28, Pittsburgh	1.80	1.80	1.80	1.82
Sheets, blue an., No. 10, Pbgh.	1.35	1.35	1.30	1.35
Sheets, galv., No. 28, Pbgh....	5.00	3.40	3.40	2.77
Wire nails, Pittsburgh.....	1.55	1.55	1.60	1.50
Connellsville fur. coke contr...	1.65	1.65	1.65	1.85
Connellsville fdy. coke, contr...	2.25	2.25	2.25	2.35
Heavy melting steel, Pbgh....	11.75	11.75	12.00	12.00
Heavy melting steel, east'n Pa.	11.00	11.25	11.00	10.75
Heavy melting steel, Chgo.....	9.50	9.25	9.89	9.75
No. 1 wrought eastern Pa.....	12.50	12.50	12.50	12.50
No. 1 wrought, Chgo.....	8.75	8.75	9.00	8.88
Rerolling rails, Chgo.....	10.00	10.00	11.25	11.25
Car wheels, Chgo.....	10.00	9.75	11.75	11.25

(For Additional Prices See Page 1286.)

Steel Making Pig Iron Leads in East

And Sale of Basic is Also Made at Pittsburgh at Advance Over Price Which Prevailed for Five Months

Philadelphia, June 14.—Steel-making grades still make the best showing in the iron market in this territory. Foundry and forge irons are backward as far as new buying goes, though there is a better undertone applying likewise to these grades, which comes from the attitude of sellers to accept forward orders with greater reserve in the expectations of more active conditions at later periods. Fundamentally the situation appears to be improving. Eastern Pennsylvania furnaces are shipping more iron than they are making as shown by the monthly figures of the Eastern Pig Iron Association. These disclosed a substantial gain in unfilled orders and a considerable reduction in stocks on hand during the month of May. Furnace operations were unchanged. In addition to the approximately 30,000 tons of basic purchased last week by the Lukens Iron & Steel Co., as fully reported, there have been other transactions in this grade with eastern Pennsylvania steelmakers. It is ascertained one tonnage lot was closed quietly, but little is known in the open market regarding this transaction. The American Iron & Steel Mfg. Co., which is about to start a new open hearth plant at Lebanon, Pa., is inquiring for 6,000 tons of basic for July, August and September. Some inquiry for basic for a conversion deal has been circulated by middlemen. Basic is firm at $13.75 to $14, delivered eastern Pennsylvania. New orders in low phosphorus are moderate. Several thousand tons additional for forward delivery have been booked by eastern makers at higher prices. Standard iron remains $20 to $21, Philadelphia basis. Lebanon district makers continue to ship actively and are holding prices more firmly, so that $16.50 to $17, furnace, now represents their level. Makers of foundry iron are inclined to ask higher prices, but their intentions have not been solidified in the absence of much buying. Less iron now seems available at the minimum of $14.25 to $14.50, Philadelphia, for No. 2X. A Trenton buyer asking 1,000 tons of special foundry is understood to have closed. Pipe and puddling forge are quiet. Quite a few foundry iron consumers are anticipating deliveries.

Market Sentiment Better

Buffalo, June 15.—Producers of the Buffalo district feel that the market sentiment is better and also report that the inquiry for iron is improving. There is no disposition on the part of the furnaces to seek business aggressively for forward delivery, as they are disposed to the belief that the future of the market holds better things in store from the viewpoint of the producer.

Interest in malleable seems to have strengthened within the past week or 10 days. Inquiries are being figured upon for 2,000 to 3,000 tons for users in the eastern part of the state. The sales of all grades during the week were light, being mostly in carload and 200 to 500-ton lots.

The steady shipment of iron under contract, previously reported, is keeping up with the demand from melters increasing. No changes in prices are reported for the week, but the sellers agree that the price situation is somewhat firmer than it has been.

Basic Commands Higher Prices

Pittsburgh, June 15.—A prominent eastern consumer has closed negotiations for 9,000 tons of second half basic pig iron with a valley interest at $12.80, furnace, or 30 cents above the price prevailing the first five months of the year. Some dealers are asking $13, valley, for this grade. Demand for standard basic is fairly heavy; one steel company in this district is in the market for 10,000 tons and another is asking bids on 5,000

(*For complete prices see page* 1286.)

tons for last half shipment. The market for foundry grades continues to show some snap and indications are that prices will advance shortly. A local foundry interest has taken 1,000 tons of malleable at $12.75, valley; a Monongahela City foundry has bought a fairly heavy tonnage of No. 2 foundry at $12.50, valley, and a Johnstown radiator interest has closed for about 2,000 tons of foundry on the basis of $12.50, valley for No. 2, all for last half shipment. The Carnegie Steel Co. is operating 44 of its 59 blast furnace stacks.

Sales are Light

Cleveland, June 15.—Sales of pig iron continues to be light, but this is attributed to the fact that nearly all buyers in this territory contracted some time ago for their last half requirements and neither buyers nor sellers are anxious to take up at this time consideration of requirements after Jan. 1. Shipments are going forward satisfactorily.

Indiana Melter Buys

Cincinnati, June 15.—The Hercules Gas Engine Co., Evansville, Ind., has closed for about 3,000 tons of iron, divided between northern and southern foundry and charcoal grades. This is the only transaction of importance in the market during the past week. A central Indiana melter has a tentative inquiry out for 700 tons of southern iron. The market is very quiet and absolutely devoid of features. Southern No. 2 foundry iron is quoted at from $9.50 to $10, Birmingham basis, and southern Ohio No. 2 foundry at from $12.50 to $12.75, Ironton basis, both for last half delivery.

Only Small Inquiries

St. Louis, June 14.—There is no improvement in the pig iron situation in this market. Nothing but car load inquiries are reported, and only a few of them. Sales last week amounted to 200 tons of southern and 200 tons of northern iron. Northern iron is a little stiffer in price, being held at $13 to $13.50 Chicago and Ironton. Southern No. 2 is quoted here at $9.75 to $10, Birmingham basis. The freight rate is $3.40.

Moderate Increase in Activity

New York, June 15.—More activity in a moderate way has sprung up in the iron market in this district and accompanying this a better sentiment among producers has developed, especially as to forward deliveries. The usual opinion now expressed is that the outlook for pig iron is more promising and that better prices are in prospect, so that the furnaces are not so willing to book forward orders at the close prices which have prevailed.

Certain consumers also are showing some of this bullish opinion. In certain cases, these buyers have closed for lots of iron at prevailing prices which they will carry on the banks of the furnaces for 1916 consumption. They figure this affords a profitable investment for idle capital and that the carrying charges are likely to be much more than absorbed by an advance of the market. This is practically the only way buyers may obtain 1916 metal at this time, as none of the furnaces will sell for such future deliveries.

At the same time, whatever improvement is observable is largely in terms of sentiment and expectation. The melting position of the general run of foundries in this territory still lacks uniformity, some plants doing better than others, but the trend is upward. The American Steel & Wire Co. has been the buyer from an eastern maker of 4,000 to 5,000 tons of standard low phosphorus iron to fill out its requirements for the remainder of the year at its Worcester, Mass., plant. A Paterson, N. J., buyer has asked for 1,000 tons of No. 1X and 1,000 tons of No. 2 plain; a Connecticut buyer for 2,000 tons of malleable and several other lots of 500 to 1,000 tons of foundry have been put out by buyers in this district. These inquiries are largely for shipment over this year. There have been further sales of iron, principally southern, to buyers in this city outside the iron business, who will hold this iron for investment. One additional transaction of about 10,000 tons is noted and negotiations still are going on. The tidewater range on northern No. 2X for nearby or for the next few months has undergone no change, and stands at $14.25 or $14.50. Export trade in iron has been quiet but various negotiations are under way.

Demand Continues Slow

Chicago, June 15.—Indications are that melters of pig iron in Chicago territory are sufficiently covered for last half requirements with a few exceptions and inquiry has fallen off to small proportions. Inspection of furnace books reveals that buying has been on a scale dictated largely by operations of the past year and engagements are not up to normal. It would seem that an increased demand for products of foundries would require further buying and that unless foundry business remains at its present volume, considerable tonnages of pig iron will be required to finish the year, in addition to those already contracted.

Northern foundry No. 2 and malleable are unchanged at $13, Chicago furnace, and no tempering of demand for premiums for added silicon is noted. Melters are taking their iron readily and requests for delayed shipments are much less evident than for several months.

Southern iron is equally quiet and so little inquiry is being made that the market is scarcely given a fair test. A number of sellers are holding firmly for $10, Birmingham, for second half, and, while rumors persist that prompt iron may be obtained at $9.75 and even $9.50, Birmingham, there is not sufficient real business to verify this quotation.

(For complete prices see page 1286.)

Hagar Portland Cement Co. Organized

A charter has been issued under the laws of Maine to the cement company projected by Edward M. Hagar, who lately resigned the presidency of the Universal Portland Cement Co. for the purpose of organizing a company to acquire and operate a chain of cement plants to cover the territory between the Atlantic seaboard and the Rocky mountains. The new company is called Hagar Portland Cement Co. Its capital stock is $20,000,000, all common.

Mr. Hagar announces the election and appointment of the following list of officers and assistants: Edward M. Hagar, president; Morris Metcalf, vice president; B. H. Rader, vice president and sales manager; Gordon Wilson, secretary and in charge of cost accounting; Leonard Wesson, assistant to president in operation and construction; J. P. Beck, assistant to president in extension work; C. W. Lyon, engineer of economies; J. H. Barbazette, superintendent of construction.

Pending the election of a permanent treasurer, the office will be filled by Gordon Wilson.

The general offices of the company are located at 208 South LaSalle street, Chicago.

Charles U. Geesey has been appointed chief chemist at the plant of the Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. Mr. Geesey was formerly assistant chief chemist at the Gary, Ind., plant of the United States Steel Corporation.

President E. A. S. Clarke of the Lackawanna Steel Co. is recovering at his summer home at Seabright, N. J., from a recent illness which has kept him from his office.

Bar Contracts Are Made

For Six Months by Agricultural Implement Manufacturers Who Had Insisted on Yearly Contracts

Chicago, June 15.—Agricultural implement makers appear to have capitulated and within the past 10 days the larger part of tonnage required for their operations during last half has been covered. It is stated this business went at 1.39c, Chicago mill, and in some instances at a somewhat higher mark. The contention of mills that they would not take business beyond Jan. 1 was adhered to stiffly and no western producer has receded from that position. It is rumored that one Pittsburgh concern sold some tonnage for first half at 1.25c, Pittsburgh, but it is not known how much material was involved.

Steel bars for other purposes are being contracted and specified in large volume and the leading producer has given notice of an advance to 1.25c, Pittsburgh, for immediate delivery, with a further advance to 1.30c, Pittsburgh, for second half. Independent western producers have not followed this advance, as they are not yet in a position as to tonnage to make the increase. With the wave of activity which has been evident in the east for some weeks now having its effect in the west, tonnages may improve shortly to a point where an equivalent advance will be possible.

Seeking 1.20c Contracts

Philadelphia, June 15.—Some of the larger consumers of steel bars apart from the farming implement trade, in this territory have set out to develop a 1.20c, Pittsburgh, price for last half, but thus far they have not been successful. Among the buyers who are figuring for last half are the Pennsylvania railroad, which normally requires 3,000 to 4,000 tons in six months, and the Baldwin Locomotive Works, with regular requirements of about 1,000 tons of merchant bars. This latter inquiry is in addition to the 3,000 tons for ammunition shells now pending for that company. It is learned that some buyers have offered regular customers 1.20c, Pittsburgh, for third quarter, or on the average $1 above present second quarter contracts, and 1.25c, Pittsburgh, for fourth quarter. As stated last week, some last half contracts have been closed at 1.25c, Pittsburgh. On new business for immediate specification, 1.20c, Pittsburgh, usually is quoted. Buyers are specifying actively against second quarter contracts which expire this month. An order for 350 tons of cold-rolled rounds for the Frankfort arsenal has been closed. The Jones & Laughlin Steel Co. took 135 tons of flats for the Panama canal. There is renewed talk of another effort to advance shafting to 68 off. Such a figure recently was named by makers, but the market slipped back to 70 off on desirable business.

Bethlehem's New Mills

New York, June 15.—The initial operations of the new bar mills of the Lehigh plant of the Bethlehem Steel Co. are about to be inaugurated. The new 10-inch mill will start within a week and the six or seven other mills will be put in commission at a later date. The company now is taking business for the new capacity. These new mills are expected to be operated primarily on high-grade and special steel bars, but a limited amount of ordinary soft steel tonnage has been taken in getting a new 10-inch mill under way. The Bethlehem Steel Co., which recently inquired for 10,000 tons of 3½-inch rounds for shrapnel, now is expected to roll this requirement on its own mills. The market still is showing a large inquiry for finished shrapnel and shrapnel bars with Italy looming up as an important new buyer. One new inquiry for 20,000 tons of shrapnel bars is afloat. Contract prices on steel bars for third quarter show some spread and range from 1.20c to 1.25c, Pittsburgh, or 1.369c to 1.419c, New York. Specifications against present contracts are active.

Bar Makers Busy

Pittsburgh, June 15.—Heavy buying of bars for the manufacture of war material continues to be the feature of the market. Practically every machine shop in this district is busy making war material of some description and most steelmakers are furnishing heavy tonnages of bars for this purpose. As noted elsewhere, steel bars for shipment to Oct. 1 are being quoted at 1.25c by several manufacturers. Bar iron is named at 1.25c by makers in this district.

Extending Deliveries

Buffalo, June 15.—Mills and agencies of the Buffalo district report a more encouraging situation than in a number of months. In bars and the other finished lines, the demand is keeping up to good proportions, mills are falling behind in deliveries, prices have become firmer and shipments on contracts show the material is going direct into consumption.

Specifications are steady with the approaching end of the second quarter and few cancellations are expected. Users in several instances have sought to secure deliveries from the mills within two or three weeks, but were unable to do so.

(*For complete prices see page* 1286.)

Strong at Cleveland

Cleveland, June 15. — Nearly all agricultural implement manufacturers in this district have contracted for steel bars at 1.20c, Pittsburgh, for the six months beginning July 1. Some contracting has, however, been done for the year beginning July 1, the price to Jan. 1 being 1.20c, and for the next six months, 1.25c. Leading makers have advanced their quotations to 1.25 for immediate delivery and for third quarter. Specifications are coming in very liberally and the bar market is strong.

Bar Iron Sluggish

Chicago, June 15.—Demand for bar iron is almost entirely absent from this market and operations of mills have been reduced materially. No change has taken place in prices, 1.20c, Chicago mill, being quoted and it is a practical certainty that no further buying would be stimulated by quoting lower prices.

Hoops, Bands and Shafting

Pittsburgh, June 15.—The market for cold rolled shafting continues to show strength. Several makers are refusing to sell material at less than 68 per cent off list and indications are that quotations below that level soon will disappear entirely. Manufacturers of shafting are operating plants at capacity. Bands have been advanced to 1.25c by some makers; hoops are being quoted at a range from 1.25c to 1.30c.

Wire Products

Are in Very Active Demand for Foreign and Domestic Uses

Pittsburgh, June 15.—The continued high price of spelter has caused several manufacturers of galvanized wire products to withdraw from the market. The prevailing 80 cent extra for galvanizing wire is being maintained and it is believed another advance will be announced shortly. Domestic and foreign demand for wire products is heavy and some mills are unable to promise material for anything like prompt delivery. Quotations appear firmer than a fortnight ago.

Galvanized Sheets Higher

And Makers Are Asking Several Dollars Per Ton More Than Recent Quotations—Black Sheets Weak

Pittsburgh, June 15.—Manufacturers of galvanized sheet products have either withdrawn from the market entirely, or are asking from 5c to 6c for No. 28 gage. Abnormally high prices are expected to prevail until the price of spelter declines considerably. Automobile interests are beginning to figure in the market for last half sheet requirements and a number of attractive tonnages have been booked. No. 28 gage black sheets are being held at 1.80c, although that figure continues to be shaded in adjacent territory. Blue annealed sheets are listed at 1.35c for No. 10 gage, but this price is shaded.

Tonnage Good; Prices Poor

Philadelphia, June 14.—Mill orders in blue annealed sheets are holding up actively with eastern Pennsylvania makers, but prices remain so low that producers find little satisfaction in this business. The market continues from 1.30c to 1.35c, Pittsburgh, for No. 10 blue annealed, or 1.459c to 1.509c, Philadelphia. Practically all new business is at the latter level. Pacific coast trade with eastern mills remains backward owing to the announcement of the new transcontinental rail rates having been delayed. One steamship line is quoting 40c per 100 pounds from New York to Pacific ports while the other maintains a 45c rate.

Black Sheets Weaker

Chicago, June 15.—With galvanized sheets practically out of the market on account of the prohibitive price of spelter, mill capacity is being employed on black sheets and prices are weaker. No difficulty is experienced in obtaining tonnages of black sheets No. 28 gage at 1.89c, Chicago mill, although some business is being taken at 1.94c, Chicago mill.

No change has taken place in the galvanized situation and no producers are willing to quote on any basis until spelter is reduced materially.

Stationary at Cincinnati

Cincinnati, June 15.—For the first time in three weeks, galvanized sheets have not advanced within a period of five days, but they are very strong and are being held firmly at the high level of from 5.50c to 6c, Pittsburgh basis, for prompt delivery. Sales are fair, considering the uncertainty of the market and the limited shipments that dealers will make. Black sheets are unchanged at from 1.80c to 1.85c, Pittsburgh basis.

Black Sheets Weak

Cleveland, June 15.—Both black and blue annealed sheets are weak and reports continue to be heard of prices being made considerably below 1.80c for No. 28 black and 1.35c for No. 10 blue annealed.

Tin Plate Offers Better Tone

Pittsburgh, June 15.—Moderate improvement has been reflected by the market for tin plate the last week or 10 days. Specifications are coming out in better volume and quotations show less irregularity. Demand for tin plate for export continues heavy, but no large single orders have been placed this week in the open market.

Billet Prices

Are Stiffening—Sheet Bar Specifications Are Lighter

Pittsburgh, June 15.—Sellers of billets and sheet bars at Pittsburgh are refusing to offer products at prevailing quotations. Billets are being held at $21 and sheet bars at $22, Pittsburgh mill. At Youngstown, a fairly heavy tonnage of sheet bars was sold last week at about the minimum price quoted by *The Iron Trade Review*. The closing down of galvanizing departments in sheet mills has reduced specifications for sheet bars to a considerable extent. Domestic and foreign demand for wire rods is heavy. Material is being held at a spread from $25 to $26, Pittsburgh. Muck bar is listed at $27, Pittsburgh.

Shell Orders Increase Tonnage

Philadelphia, June 14.—Billets of special quality are being actively specified by consumers with eastern Pennsylvania makers and much of this is attributed to demands arising from the manufacture of ammunition. There is not much new buying, however, either domestic or foreign. A number of export inquiries are pending on which buyers seem slower to act. One new lot in this territory this week called for 400 tons and some skelp also was asked. Eastern Pennsylvania billet makers continue to receive inquiries from around Pittsburgh and there are other indications that certain makers in the latter territory are conserving their supplies, especially in open hearth quality and are less willing to sell. Rolling billets remain $22.06 to $22.56, Philadelphia, with forging $3 to $4 or more higher in accordance with the analysis.

(For complete prices see page 1286.)

Sales for Export

New York, June 15.—Some further good-sized tonnages of domestic billets and skelp have been made for shipment to the British Isles during the past week, which usually have netted better than domestic prices. Middle western makers have been taking considerable of this business and the prices obtained have been $19.50 to $20, and in some cases higher for billets at the mill. Eastern Pennsylvania makers also continue to make fair export sales of billets. One export sale within a few days called for 3,000 tons. A good inquiry is pending for billets for the British Isles in which is one lot of 10,000 tons.

Warehouses

Are Conserving Tonnages of Galvanized Sheets

Chicago, June 15.—Warehouse business continues steady, the most interesting feature being the situation as to galvanized sheets. One large warehouse is selling No. 28 gage galvanized at 4.85c, Chicago store, and others at 5c, Chicago store, while one sale was put over at 4.75c, Chicago store. Sales for the most part are being made only to regular customers whose needs are great and every effort is being made to conserve tonnages now in stock, as the possibility of renewing is questionable.

Continuance of the strike of structural trades remains as a detriment to buying in many lines, but in spite of this, business is almost at normal volume.

High Galvanized Prices

Cleveland, June 15.—Last week the minimum quotation on No. 28 galvanized in warehouse was 4.60c. The minimum quotation is now 5.50c and it is difficult to obtain some sizes even at that price. This advance is due to the high price of spelter. Warehouse business in general continues to show improvement.

The Steel Car Forge Co., Pittsburgh, is operating its plant at Ellwood City, Pa., at maximum capacity. The plant of the Standard Engineering Co., Ellwood City, also is running at full capacity.

Various Prices on Plates

Quotations for Third Quarter Show Some Irregularities, But General Tendency is Upward

Philadelphia, June 14.—Some price irregularity in plates for both immediate and for forward delivery under contract is to be noted as the end of the second quarter approaches. Some eastern makers have been taking early business at 1.15c, Pittsburgh, or 1.309c, Philadelphia, and in one case, it is stated this figure was extended into the third quarter. For all third quarter 1.20c, Pittsburgh, is acceptable to several mills, though there are cases where the makers have been holding out for 1.25c, Pittsburgh, for third quarter and 1.30c for fourth quarter. Incoming tonnage is well maintained generally with eastern mills, though there are some statements of less business entered the past week. Ship building activity continues on a higher scale than ever. The Maryland Steel Co. has taken a second boat within a week for the Munson line, which increases the total eastern awards to 37. The Cambria Steel Co. will supply the steel for the boat. Many contracts for vessels remain under negotiation. The 250 locomotives for Russia taken by the Baldwin Locomotive Works, will require 6,000 to 7,000 tons, it is estimated, part of which is expected to go to eastern and the remainder to Pittsburgh mills.

Plates Advanced

Pittsburgh, June 15.—The Carnegie Steel Co. and at least one of the independent manufacturers have boosted quotations for plates, shapes and bars $1 a ton and are now asking 1.25c for shipment to Oct. 1. Plates are the weakest item on the list of the three leading hot rolled products. Material continues to be offered at as low as 1.15c in isolated cases. Buying of steel cars, noted in previous issues of *The Iron Trade Review*, has greatly benefited the market for structural material. Finishing mills in the Greater Pittsburgh district are operating at from 75 per cent to 80 per cent of capacity.

Nearly 60 Vessels Pending

New York, June 15.—There is good authority for the statement that the number of vessels now in the market before eastern shipyards reaches the large total of approximately 60. As stated previously, some of these propositions call for fleets of ten vessels. The Ward line is reported to be one of the companies now figuring on such a string of boats. Included in the pending list of boats are some of the largest vessels yet proposed, these having a registry of about 18,000 gross tons. It is understood that English shipping interests, because of the filled-up condition of the yards there, have endeavored to arrange with eastern builders for the construction of a number of merchant ships. One of the belligerent countries has been placing orders for pontoons in this country.

Plate prices in this territory for prompt or third quarter delivery remain 1.20c, Pittsburgh, or 1.369c, New York. On desirable orders for immediate specifications, some eastern mills will do $1 less.

Upward Tendency

Cleveland, June 15.—The tendency of the plate market on the whole is upward, but some mills outside of Cleveland have recently made contracts at low prices. The strength of the Pittsburgh market is being felt in Cleveland and higher quotations are very probable.

Plates Are Stronger

Chicago, June 15.—Demand for steel plates has been considerably larger the past 10 days and prices have stiffened in keeping with it. While the leading producer has advanced its price $1 per ton, others not so well situated are still willing to sell on attractive specifications at 1.34c, Chicago mill, and probably will be until books are better filled. Some large car buying and the better position of plate mills in the east have contributed to a better situation in this territory.

Boiler Tubes Advanced

Pittsburgh, June 15.—Under date of June 15, the National Tube Co. advanced quotations for steel boiler tubes one point or $2 a ton on all sizes. Boiler tubes have been selling at decidedly low figures for more than a year. No large orders for steel or iron pipe are reported.

The Cleveland Engineering Society has arranged to attend the spring meeting of the American Society of Mechanical Engineers at Buffalo, and will leave Cleveland Wednesday evening, June 23, on board the SEEANDBEE. The members will participate in the business meetings and inspection trips on Thursday, returning to Cleveland that night.

(*For complete prices see page* 1286.)

Furnace Coke

Is Being Enquired for by Several Companies —No Labor Shortage

Pittsburgh, June 15.—Several blast furnace interests are negotiating for last half coke requirements, but no contracts for future delivery have been placed in the open market. Coke dealers express the hope that prices will advance before active buying begins. Despite the threatened labor shortage in the Connellsville regions, coke oven operators say they have been able to obtain all the help they want. The *Connellsville Courier* for the week ending June 5 says production was 314,897 tons compared with 316,890 tons the week before. No change in the position of prices is noted.

By-Product Competition

New York, June 15.—Eastern makers of by-product coke have been competing rather aggressively for orders against the beehive oven product in this territory and in some cases have been naming prices about $1 a ton below those quoted on western Pennsylvania foundry grades. The American Locomotive Co. is inquiring for its all-year needs for its various plants from July estimated at about 15,000 tons. The International Steam Pump Co. is in the market for 4,500 tons of foundry and 2,000 tons of heating coke for shipment over the last half of the year to its several plants.

Foundry Coke Strong

Cincinnati, June 15.—The foundry coke market is especially active. It is estimated that fully 75 per cent of the foundries in this territory have covered for next year's requirements, with contracts terminating July 1, 1916. Prices on 72-hour grades are very strong in all southern fields, and a slight advance is apparent on the lowest quoted grades in the Wise county district. No demand is out for furnace coke in this territory.

No Activity

St. Louis, June 14.—Coke is practically dead on the market. Prices range around $2.50 for Connellsville and Virginia foundry grades.

The Knox Pressed Welded Steel Co., Pittsburgh, will not move its plant from Sharon, Pa., according to an official report made at that city. The company had considered another site to provide necessary extensions.

Better Tone in Scrap

Some Sales in East Indicate Firmness—Dealers at Leading Centers More Hopeful

Philadelphia, June 14.—Such sales of old material of limited tonnage as are being made in eastern Pennsylvania territory, in the main, reflect a firmer undertone to conditions and are leading some sellers to predict higher prices soon. Heavy melting steel covers a range of $11 to $11.50, delivered, in sales of the week, a lot of 500 tons bringing the higher figure. Certain large buyers still offer only $11, delivered, but are getting no tonnage at that figure. Low phosphorus is strong, 250 tons selling at $15, delivered, with some dealers now asking $15.25 and $15.50, delivered. Further sales of No. 1 railroad wrought at $13, eastern Pennsylvania, are reported and higher iron is quoted by some dealers. The Southern railway wrought brought $11.25, Alexandria, equivalent to $13.25, eastern Pennsylvania. A Philadelphia foundry bought 500 tons of heavy cast at $12.50, delivered. An offer of $8.50, delivered, for 500 tons of borings is out. Stove plate still commands $9.50, delivered, from some consumers. All the railroad lists in this territory just closed brought better prices compared with last month.

Prices Are Firm

New York, June 15.—A better feeling has come over the old material market in this territory, but it cannot be said that it has as yet increased the volume of sales. Prices are holding firmly and in some grades there is a tendency toward advances. A sale of 1,000 tons of No. 1 heavy melting steel at $11.50, delivered eastern Pennsylvania, was closed this week, and this appears the minimum level at which buyers can obtain any tonnage. Sales of high grade heavy cast at $12, delivered Jersey points, are noted with ordinary quality bringing about 25 cents less. The Interborough Rapid Transit Co. and Brooklyn transit lines have sold in this market this week several thousand tons of mixed iron and steel grades.

Heavy Melting Steel Active

Buffalo, June 15.—Large sales of heavy melting steel have been made in the past week in the Buffalo district and at the price of $10.75 to $11, reported a week ago. A number of sales of fair volume have also been made in railroad malleable, which has advanced to a price of $10.50 to $11, and also in cast scrap, which has also gone up a peg to $11 to $11.50. Further increases in the demand for these lines, according to the dealers, will mean a further advance in prices. A slight reaction is noted in machine shop turnings, but not sufficiently to effect schedules. Prices of the other lines remain the same as previously quoted.

Dealers Hopeful

Pittsburgh, June 15.—While the market for old material shows no snap, yet dealers express the belief that more satisfactory conditions soon will be enjoyed. Consumers have heavy tonnages in stock and are not expected to figure in the market until after the opening of the second half. Heavy melting steel is being held at $11.75. Low phosphorus scrap reflects moderate strength; it is being held at $15.25 by most dealers.

Dull at Cleveland

Cleveland, June 16. — The scrap market continues extremely dull, almost as dull as it was during the extreme period of depression in 1914. Supplies are exceedingly large, while mill demand is light. It is not surprising, however, that it takes some time for the betterment in the steel trade to reach the raw materials market, particularly scrap. During the two-years' period of depression, pig iron output was drastically curtailed, furnaces blowing out when there was no market for their product. But scrap continually was turned out, regardless of business conditions. Bridges were replaced, buildings torn down, railroad equipment and track material wore out, all furnishing their quota of scrap. The supply of shop steel, etc., produced by manufacturers was diminished, of course, but as a whole the supply of scrap is larger than in years.

Prices Weak

Cincinnati, June 15.—Prices on all grades of iron and steel scrap are weak, and a decline in prices would probably occur if sufficient business were being done to form a basis of comparison. New sales are very scarce and light, but shipments on old contracts to rolling mills are good. Jobbing foundries are buying very sparingly and in small lots. Deliveries during the past week have been heaviest on No. 1 machine cast, heavy melting steel, No. 1 busheling and bundled sheet scrap.

(*For complete prices see page* 1286.)

Chicago Scrap Inactive

Chicago, June 15.—Buyers remain in control of the scrap iron and steel market in Chicago, but neither buyers nor sellers are anxious to trade. The market is weak with quotations nominally unchanged and practically no volume of material moving to consumers.

Railroads continue offering considerable tonnages which are being absorbed and so far have not depressed quotations. The Soo line offers 2,000 tons, the Chicago, St. Paul, Minneapolis & Omaha railway 690 tons, Chicago Great Western 1,000 tons, Michigan Central 2,300 tons, Chicago, Peoria & St. Louis 500 tons, Northern Pacific 1,800 tons and the Belt Railway of Chicago 500 tons.

Firmer at St. Louis

St. Louis, June 15.—The scrap market was of a firmer tone last week, and while prices have not advanced to any great extent, the railroads have been receiving top market prices for their offerings, which is an indication that dealers look for a better market in the immediate future. Relaying rails continue in good demand, and prices are firm at $21.50 to $23 a gross ton, according to their condition.

Railroad lists before the market this week are: Cleveland, Cincinnati & St. Louis, 4,200 tons, of which 1,700 tons are long length steel rails, and 600 tons No. 1 railroad wrought; Missouri, Kansas & Texas, 1,700 tons, of which 200 tons are bent and twisted steel rails; Chicago, St. Louis, Minneapolis & Omaha, 700 tons; Terminal Railroad Association, 600 tons; Vandalia, 300 tons; St. Louis & San Francisco, 200 tons; Chicago & Western Indiana, 150 tons.

Rivets Advance

Owing to Improvement in Demand and Higher Price of Bars

Cleveland, June 15.—Minimum quotations on rivets have been withdrawn and 1.50c on structural and 1.60c on boiler rivets are now declared to be minimum quotations for third quarter. Rivet manufacturers are not anxious to sell beyond the third quarter. The firmer prices are due in part to improvement in business, but largely to the advancing price of steel bars.

Nuts, Bolts and Rivets

Pittsburgh, June 15.—Makers of nuts, bolts and rivets say the market reflects moderate improvement and the new bolt prices are being adhered to. No large orders are noted.

Cast Pipe Plants

Well Filled in the Central West—Buyers Urging Delivery

Chicago, June 15.—Cast iron pipe makers find their foundries well filled and busy, with buyers insistent in demanding prompt delivery, which is not possible in all cases. A few municipal lettings of considerable size are pending and some business from contractors is also being booked. The United States Cast Iron Pipe & Foundry Co. has taken 300 tons at Milwaukee and a like tonnage at Area, Ill. Bids were opened at Kenosha, Wis., June 14 on about 3,000 tons of 42-inch intake pipe. Cincinnati opens bids June 16 on 2,000 tons and St. Louis will award 2,600 tons June 22.

St. Louis Will Buy

St. Louis, June 15.—The city is in the market for 2,595 tons of cast iron water pipe and 350 tons of special castings. Bids will be opened June 22.

Inquiry is Heavier

New York, June 15.—New inquiry for cast iron pipe from municipalities has been somewhat heavier during the past week in eastern territory. Private buying remains good and the general tonnage of the market, on the whole, is satisfactory to producers. Prices hold more firmly, but do not appear to be making much advance at present. Among the new inquiries are 1,100 tons of 4 to 8's for Southeastern, Mass.; 680 tons of 6 to 8's for Sabado Lake, Me.; 160 tons of 4 to 6's for Greenville, N. H., to close June 16; 215 tons of 6 to 8's for Gardner, Mass., and 410 tons of 48's for the Brooklyn subway, which is a contractor's letting. Lewiston, Me., placed 176 tons of 6's with the Standard Cast Iron Pipe & Foundry Co. at $24.25, delivered; Malden, Mass., 136 tons with the Warren Foundry & Machine Co. at $23.80, delivered, for the 6's, and at $22.80, delivered, for the 12 and 16's; and the Canadian Iron Corporation has 615 tons of 18's for Sydney, N. S., at $33, delivered. Bids were taken a day or two ago on a contractor's letting of 715 tons of 4 to 48's for Brooklyn. Arroyo, Porto Rico, has revived an inquiry for 1,000 tons of 4 to 12's.

Preparing for a Big Strike

Officials of the International Association of Bridge and Structural Ironworkers have made the statement that preparations have been made for a general strike of the 10,000 inside iron workers of New York City. The demands are for a maximum week's work of 48 hours, minimum salary of $22 a week for a finisher and $16 for a helper; time and one-half for overtime; no overtime on Saturdays; not more than four hours any week; double time Sundays and holidays; shop chairman and full recognition of the union; business agents to have the right to visit the shop, and sanitary conditions.

Ferro Prices

Are Not Uniform—Sales of Spiegel at Prevailing Quotations

New York, June 15.—Some divergence in ferro-manganese prices has continued to appear. As recently noted, prompt domestic ferro-manganese has been sold at $115 at the maker's plant. A carload sale of prompt within the week also was made at $100, seaboard, and an eastern Pennsylvania buyer who inquired for 150 tons for July, August and September, is reported to have bought at less than $100, seaboard. This may refer, however, to questions of delivery. Leading sellers are quoting $100, seaboard, on English metal for forward delivery, which is the official price, but one or two interests have been naming a lower figure, particularly for late-year shipment. There is more miscellaneous inquiry for prompt shipment in the market, including one lot of 400 tons in the Pittsburgh district, another for 200 tons and smaller quantities.

Further shipments of English ferro-manganese against contracts to buyers in this country are noted. The SWANMORE has arrived at Baltimore with several hundred tons. The MIDIAN has sailed from Liverpool with some tonnage. The MAGICIAN is afloat. The TUNISIANA now is loading to bring in about 3,000 tons at Philadelphia or Baltimore some time in July.

Additional sales of about 1,000 tons of domestic spiegeleisen have been closed at the prevailing prices, which are about $25 to $26 at the furnace. There is some foreign inquiry for ferro-silicon.

Ferro Quiet at Pittsburgh

Pittsburgh, June 15.—The market for ferro-manganese in western Pennsylvania and eastern Ohio is quiet. Dealers are quoting $115, seaboard, for prompt shipment, but no trace of recent sales can be found. Lower grades of ferro-silicon reflect moderate strength, but there has not been enough new buying to establish higher quotations than those quoted by *The Iron Trade Review*. Dealers describe demand for ferro-tungsten, ferro-chrome, ferro-molybdenum and vanadium as fairly heavy, and prices for all these products are comparatively high.

(*For complete prices see page* 1286.)

Lake Ore

Proves Satisfactory to an Eastern Pennsylvania Company

Cleveland, June 15.—An eastern Pennsylvania steel company, which last year substituted a considerable tonnage of lake ore for other ores which it had used in previous years, was so well satisfied with the results that it has again entered an order for more than 100,000 tons of lake ore with a Cleveland agency.

Statistics compiled by the Lake Superior Iron Ore Association show that the shipments of ore from docks to furnaces during May amounted to 2,797,481 tons. The tonnage on dock June 1 was 5,970,115, compared with 5,772,462 tons on dock June 1, 1914.

Although sales of ore at present are light, the improvement in general conditions is reflected to some extent in the feeling in the lake trade and it is believed that the figures of ore shipments from the mines for June will show a larger tonnage than has been estimated. It is also intimated that some of the large steel companies may increase the tonnage which they expect to move this season.

Takes Lake Ore

Philadelphia, June 15.—An Eastern Pennsylvania steel company has negotiated a large purchase of lake ore to be delivered over a considerable period. The exact tonnage is not stated, but it is understood to be considerably in excess of 100,000 tons. Outside of this transaction, as far as known, there has been no sizeable buying of lake ore by eastern consumers. The eastern ore market remains very dull. New buying of trans-Atlantic ore by eastern users in competition with lake ore, appears out of the question at present because of the high freights and other circumstances. Some negotiations for Indian manganese ore are under way with buyers in this district.

The No. 1 Hokendauqua furnace of the Thomas Iron Co., at Hokendauqua, Pa., was blown in on June 14, after having been banked since May 20. During the shut-down, a new cold blast main was erected for the No. 1 and No. 3 furnaces. The No. 7 Lock Ridge furnace at Alburtis, Pa., was blown out on June 4. At the present time, the Thomas Iron Co. has its No. 1 Hokendauqua and No. 8 Alburtis furnaces in blast.

Urgent Demand for Ammunition

Is Plainly Stated by Lloyd George—Allies Looking to the United States for Greater Supplies—Prices of Finished Materials Advancing

Office of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., June 4.

The industrial aspect of the war is daily coming into greater prominence. Lloyd George's first speech, at Manchester, as minister for munitions, with its frank statement that Przemsyl has reverted to the enemy, simply and solely through the failure of Russian ammunition, has furnished an object lesson as to the enormous value of workshop co-operation with the soldiers in the trenches, as well as with the Jack Tars of the navy. We realise also, more than ever, the great value of American co-operation in supplementing our insufficient supplies of ammunition. Apparently, the problem is grasped at last, and several towns are acting, independently of ammunition factories, in utilizing spare machinery to turn shells and other powerful explosives. The latest development in this city is the establishment of tuition shops where untrained workers can learn to use machines preparatory to their being drafted into various factories. The rather depressing nature of the war news lately has had its usual effect in reviving interest in recruiting. We have returned to the heavy figures registered at the beginning of the war. It is increasingly evident that we have as many recruits as, for the present, can be equipped. Practically, every large manufacturing town in issuing appeals to local manufacturers, who have even a single machine available, to assist in shell manufacture.

Coventry, for instance, has accepted a first contract for 100,000 shells for early delivery. Birmingham is sure to co-operate, on at least an equal scale. Probably, shall do much better. Happily, Birmingham is practically free from strikes. There is an increasing determination on the part of the government to take stern action if the patriotism of the workers does not suffice to put a stop to these disgraceful occurrences. There is every reason to believe that the labor leaders are prepared to co-operate, in the spirit asked for by Mr. George at Manchester in his striking speech. We shall all be disappointed if the output of shells is not enormously increased in a short time. It is marvelous how well the courage of the community is maintained, in spite of the terrible casualty lists, more than confirmed as they are by the rapid increase in the number of persons in the street wearing mourning attire. Naturally, the attitude of America and the ultimate policy, following the correspondence with the Kaiser, is regarded with the greatest interest here, but we know that, under any circumstances, the sympathy and assistance of our Anglo-Saxon cousins will be with the allies.

Pig Iron Steady

Pig-iron prices have continued very steady, and have scarcely changed during the past week. But nobody expects that these rates will continue. A large number of contracts are approaching completion, and this is a great buying period. No smelter is prepared to accept business for the future, without a substantial premium. Fuel continually gets dearer, and foundry coke, as well as coal, is likely to realize fancy prices. Blast furnacemen's wages will be increased, inasmuch as furnacemen share the advances declared under the wages boards, namely 5 per cent in the north of England, and 2½ per cent in other districts. Production is carried on under such difficulties that many furnace owners would be glad to shut down, but they are largely restrained by feelings of patriotism and it is doubtful whether the government would sanction any restrictions of output. In the Cleveland district, better sales are looked for. The intervention of Italy will open the ports of that country for pig iron supplies. Italy has been for years a very good buyer of Cleveland foundry iron, and she will not now require a special license from our government, before shipments can take place. Stocks are only slightly increasing and shipments last month amounted to 9,000 tons while stocks in hand are 150,000. Today's quotation is 65s 2d ($15.64) with an additional 1s 0d (24c) for one month. There are no three months' quotations. Prices of East Coast hematite are steady and it is still possible to buy mixed numbers at 102s 6d ($24.60). A very large proportion of the make is going direct for war purposes.

Finished Prices Higher

Prices of all descriptions of finished iron and steel are steadily rising. Several further advances have taken place during the week. The most important is a rise of 10s ($2.40) in finished steel joists, plates, and sections agreed upon by the steel associations of England and Scotland. This makes angles £9 15s ($46.80) and joists £9 10s ($45.60) and angles £10 ($48.00). Most of the works are behind in their deliveries. This is especially the case in Scotland, where all the works are producing to full capacity, nearly all of the product being for government requirements. Orders come in more rapidly than they can be executed. The supply of half-raw steel from America continues to increase, especially to Scotland. While English consumers are buying more American and Canadian billets, there are great difficulties in getting transit.

Spelter is attaining amazing figures. Yesterday £105 ($504.00) delivered in Birmingham was demanded. The effect has been practically to kill the galvanized sheet business. Some of the mills have stopped production, but for such business as was on offer £20 ($96.00) was quoted. A number of people are now using special paints and other rust resisters which are said to serve as a very fair substitute for spelter, as a protective coating.

Business is being carried on under great difficulties chiefly on account of fuel scarcity and more or less continuous individual enlistments.

The tin plate trade continues excellent, with good home and foreign orders. The mills are as fully employed as they are able to be, in view of labor scarcity, but, unfortunately, a number of them have had for various reasons to cease operations.

The United Engineering & Foundry Co., Pittsburgh, has refused to take orders for war material for belligerent European nations. The company has been called upon numerous times to make ammunition.

More Structural Awards

Developing in the West—Little Activity in the East —Pittsburgh Mills Advance Quotations

Chicago, June 15.—Contracts for structural shapes in the west are becoming much more numerous, the greater tonnage coming from railroad activity. The American Bridge Co. has closed the contract for the Paducah & Illinois railway bridge at Metropolis, Ill., which involves 18,000 tons, and a number of other bridges have been awarded.

Quotations on structurals are not lower than 1.39c, Chicago mill, with one producer quoting $1 per ton higher.

Bridge Builders' Report

New York, June 15.—Only a slight variation in tonnage has been shown by the total structural awards of the country during the past three months, according to the statistics compiled by the Bridge Builders' and Structural Society. During May, these reports show that 61 per cent of the shop capacity of the country, or approximately 105,000 tons, was contracted for. This compares with 62½ per cent, or about 107,500 tons, in April, and 64 per cent, or about 110,000 tons in March. The present outlook is, however, that the June lettings will not maintain this record, as awards up to this time have been comparatively light.

The reports of the Bridge Builders' Society show the percentage of capacity contracted for monthly and the approximate tonnage for each period as follows:

Month.	Per cent.	Approx. tonnage.
May, 1915	61	105,000
April	62½	107,500
March	64	110,000
February	30	51,000
January	25	43,000
December, 1914	35	60,000
November	20	35,000
October	35	60,000
September	38½	65,000
August	27½	48,000
July	68	115,000
June	56½	95,000
May	57	97,000
April	88	151,000
March	76	130,000

A relatively light volume of new structural business is being done in this territory. Inquiries are more active than awards, for the disposition to place contracts slowly still is shown. Mill buildings made necessary by war orders still furnish a fair tonnage, to which about 2,000 tons of the week's awards are attributed. The passing by the state legislature of an enabling act for New York City to provide terminal railroad facilities in Brooklyn, promises to bring about a considerable steel requirement for piers, etc., when the financial arrangements are perfected. Bids on another subway section, 6,480 tons, went in this week. Plain material prices seem easier in that certain mills are offering third quarter contracts at 1.20c, Pittsburgh, or 1.369c, New York, and this figure probably could be shaded on an attractive order for quick delivery.

Eastern Tonnage is Lighter

Philadelphia, June 14.—New bookings and inquiry for structural steel in this territory have dropped away and to date the month is behind May in business taken by eastern Pennsylvania makers. Small jobs are in less volume and there are comparatively few larger ones. A 6,000-ton building for the department of the interior, at Washington, now is out for figures. The Baldwin Locomotive Works extensions, which were enlarged after the original contract, now call for a total of 11,000 tons and there is some prospect of further buildings. Prices for plain material seem more clearly defined. It appears unquestioned that a desirable tonnage for immediate shipment can bring out 1.15c, Pittsburgh, or 1.309c, Philadelphia, but on third quarter contracts 1.20c, Pittsburgh, is well held. It is known that one eastern Pennsylvania buyer was not able to do better than this figure on 1,500 to 2,000 tons. For fourth quarter, 1.25c, Pittsburgh, is named, though this is largely nominal, as there is practically no inquiry for that period. The Lackawanna Steel Co. received 235 tons of angles for Panama.

Structural Shapes Boosted

Pittsburgh, June 15.—Indications are that quotations below 1.25c for structural shapes will disappear before the end of the month. Several of the more prominent interests already have advanced prices to that figure for shipment to Oct. 1. Estimates for the proposed city-county building at Pittsburgh have been published; it is estimated that about 7,000 tons of steel will be required.

Conditions Improving

Buffalo, June 15.—Increase in the number of inquiries for structural material is reported by the fabricators and the jobbers of this district. They also say that larger-size tonnages are appearing to be figured upon. The improvement is more pronounced than has been noted in a number of weeks. While prices of structural material have remained firm with the other finished materials at the mills, fabricating prices had become more or less demoralized in the past few months. This situation is disappearing and a disposition to firm up on prices is developing. In addition to the number of smaller jobs appearing in various parts of the territory, there are a number being figured upon, requring from 300 to 600 tons each, the aggregate representing a sizeable tonnage.

Two Akron Contracts

Cleveland, June 15.—While there is not much activity in structural contracts in this district, prices are firmly maintained on account of the strong situation at Pittsburgh. The steel for the addition to the plant of the Goodrich Rubber Co., Akron, 1,200 tons, for which the general contract was awarded to the Hunkin-Conkey Construction Co., has been placed with the American Bridge Co. The Massillon Bridge & Structural Works, Massillon, has taken 410 tons for the Cleveland Model Market Co.'s structure. The addition to plant of the Firestone Rubber Co., Akron, will be erected by the Barge Iron Co. of that city.

The St. Louis Bridge

St. Louis, June 15.—Keen interest is felt here in the request of the board of public service for bids on 24,000 tons of steel to finish the East St. Louis approach to the municipal free bridge. The official bids for the steel for the bridge will be opened in the office of the public service commission in the City Hall on June 29. The cost of the steel is estimated to be around $1,000,000. A deposit of $25,225 is required of bidders, and the commission reserves the right to reject all bids. Copies of plans and specifications will be furnished upon application to the board. The bids call for furnishing, fabricating and delivering structural steel.

CONTRACTS AWARDED

Paducah & Illinois R. R. Co. Metropolis bridge, Metropolis, Ill., 18,000 tons, to American Bridge Co.

Wisconsin River Power Co., transmission towers for line between Prairie Du Sac and Madison, Wis., 700 tons to American Bridge Co.

World-Herald Building, Omaha, Neb., 588 tons, to Morava Construction Co.

Paducah & Illinois R. R. Co., trusses and frames for Metropolis bridge, Metropolis, Ill., 540 tons, to Kenwood Bridge Co.

Chicago Milwaukee & St. Paul Ry. Co., through girder spans, 516 tons, to Wisconsin Bridge & Iron Co.

Trans-Mississippi Terminal Ry. Co. pas-

(*For complete prices see page* 1286.)

senger station and other buildings, New Orleans, 209 tons, to Virginia Bridge & Iron Co.

L. J. De Huff, Chicago, Ill., hotel building, Chicago, 222 tons, to A. Bolters' Sons.

Receivers of the St. Louis & San Francisco R. R. Co., four 77-foot deck plate girder spans, 205 tons, to American Bridge Co.

Addition to Goodrich Rubber Co.'s plant, Akron, O., 1,200 tons, awarded to the American Bridge Co.; Hunkin-Conkey Construction general contract.

Market building for the Cleveland Model Market Co., Cleveland, 410 tons, awarded to the Massillon Bridge & Structural Co., Massillon, O.

Addition to Firestone Rubber Co.'s plant, Akron O., 2,000 tons, to Burger Iron Co., Akron.

Bridge work for Virginian railways, 200 tons, awarded Virginia Bridge & Iron Works.

Bridge work for Chesapeake & Ohio Northern, 2,100 tons, previously reported as having gone to Virginia Bridge & Iron Works, now understood to have been placed finally with the Mt. Vernon Bridge Co.

Column cores for Lippincott building, Philadelphia, 125 tons, to American Bridge Co.

Building for St. Mary's College, Emmettsburg, Md., 500 tons, to Jones & Laughlin Steel Co.

Extensions to the plant of the Winchester Repeating Arms Co., New Haven, Conn., 1,550 tons, placed, of which the American Bridge Co. received 700 tons and independents 850 tons, including, it is understood, 500 tons to the Belmont Iron Works.

Loft building for Burton Bros., Twenty-ninth street and Fifth avenue, New York City, 750 tons, to the Hay Foundry & Iron Works.

Power house for the Diamond Match Co., Oswego, N. Y., 200 tons, to the Lackawanna Bridge Co.

Extensions to the plant of the Union Mfg. Co., New Britain, Conn., 300 tons, to Levering & Gerrigues.

Union Carbide Co.'s plant, Sault Ste. Marie, 300 tons, to Morava Construction Co., Chicago.

Double leaf bascule highway bridge over Mullvia river in New Jersey, 600 tons, to Lupfer & Remick, Buffalo.

Buildings for Aluminum Co. of America at New Kensington, Pa., 600 tons, awarded American Bridge Co.

Buildings for Standard Steel Car Co. at New Castle, Pa., 900 tons, awarded McClintic-Marshall Co.

Dredge boat for the Union Iron Works, San Francisco, 750 tons, awarded the Pittsburgh-Des Moines Bridge Co.

Extension to plant of the John A. Roebling Sons Co., Roebling, N. J., 2,000 tons, awarded McClintic-Marshall Co.

Forge shop for the Timken-Detroit Co., Detroit, 400 tons, awarded McClintic-Marshall Co.

Buildings for the Reznor Stove Co., Mercer, Pa., 400 tons, awarded Pittsburgh-Des Moines Bridge Co.

Buildings for the Erie Stove Co., Erie, Pa., 200 tons, awarded Pittsburgh Bridge & Iron Co.

Bridge at Youngstown, O., 400 tons, awarded the Penn Bridge Co.

CONTRACTS PENDING.

Additional bridge work for Pennsylvania railroad, 350 tons, bids being taken.

Building for department of the interior, Washington, D. C., 6,000 tons, bids to be taken July 12.

Struthers & Wells Co., Warren, Pa., factory addition, taking 300 tons structural, bids just in.

Buffalo Cold Storage Co., Buffalo, 10 story warehouse addition, bids taken Tuesday, requiring 400 tons reinforcing bars.

Victoria theater, Forty-second street and Eighth avenue, New York City, 200 tons, bids being taken.

Grandstand for the Wequahic Club, Newark, 400 tons, bids being taken.

Estimates for the city county building at Pittsburgh, about 7,000 tons, have been issued. They include the following items: Structural steel, $290,000; fireproofing, $218,656; sheet metal, $4,189; wire molding, $9,153; hollow steel doors and trimmings, $47,440; hardware, $27,454; metal windows, $65,000; ornamental iron, $72,038.

Building for Philadelphia Life Insurance Co., Broad street, Philadelphia, 180 tons, bids being taken.

Russia's Orders Announced

Equipment for the Czar Now Under Formal Contract is for 400 Locomotives and About 13,000 Cars

New York, June 15.—Russia's large and much discussed equipment orders, aggregating $25,000,000 to $30,000,000, now are under formal contract. To date, 400 lococomotives and about 13,000 cars have been definitely closed and additional equipment of both types is pending. The locomotive contracts placed give 250 to the Baldwin Locomotive Works, 100 to the American Locomotive Co. and 50 to the Canadian Locomotive Works. A remainder of 100 is pending. These locomotives are of the large 100-ton freight type and they represent one of the most important motive power contracts for a foreign nation ever closed with builders in this country.

The Russian car order as foreshadowed in *The Iron Trade Review* a week ago, was closed formally in Petrograd last Saturday. The distribution of the order, while not announced officially, is understood to have given 7,000 cars to the Pressed Steel Car Co. and 2,000 each to the American Car & Foundry Co., to the Eastern Car Co., of Nova Scotia and to the Canadian Car & Foundry Co., or 13,000 in all. There may be some further modification of this division. These cars are all of large freight types. About 7,000 small wooden cars remain under negotiation and these, if closed, will go to the Seattle Car & Foundry Co.

Other important foreign contracts for railroad equipment are coming up. The American Locomotive Co. has taken 20 locomotives for Belgium. Bulgaria is asking 10, the Intercolonial of Canada for 20 and the United Railways of Havana for six. Nothing has been done on the car order for France.

Domestic car and locomotive business is quiet. The Chicago & Northwestern is fitting out a new inquiry for 500 automobile cars. The receivers of the Rock Island are taking the necessary court steps to purchase 4,000 cars. Locomotive inquiries and orders usually are in one or two lots.

The final distribution of the Pennsylvania main rail purchase for 1915 of 155,500 tons, made under practically the old specifications, gives 69,700 tons to the Carnegie and Illinois Steel companies, 34,850 tons each to the Cambria and Pennsylvania Steel companies and 8,050 tons each to the Lackawanna and Bethlehem Steel companies. Included in this order were 38,500 tons of 125-pound sections, which went almost entirely to the Cambria and Pennsylvania companies, and 118,000 tons of 100-pound. With the 12,000 tons of experimental rails previously placed, the total order for the Pennsylvania system for 1915 is 167,500 tons. The Southern railway has given 2,100 tons more to the Tennessee Coal, Iron & Railroad Co. and still asks 5,000 tons. The New York Central has given the Illinois Steel Co. 1,500 tons additional. The Chesapeake & Ohio is negotiating for additional rails. The Pennsylvania, Lackawanna and Bethlehem Steel companies submitted identical bids on 2,500 tons of rails and track supplies for subway and elevated lines for the city of New York.

In foreign rails, France is inquiring for 5,800 tons of 40-pound sections and for some girders.

Car Builders Busy

Pittsburgh, June 15.—Car building plants and axle and car wheel shops are operating at practically maximum capacity. As noted last week, the Pressed Steel Car Co. will furnish about 7,000 cars, requiring 75,000 tons, for the Russian government. The Standard Steel Car Co. will furnish about 19,000 wheels and the Carnegie Steel Co. will supply about 9,500 axles for the Russian cars.

Buys Frogs

Cincinnati, June 14.—The public belt railway commission of New Orleans has just placed an order with the Weir Frog Co., Cincinnati, for 175 sets of manganese insert frogs, guard rails and switches. This order covers only normal requirements, but it is an index of the general steady buying of the municipally owned roads recently.

(*For complete prices see page* 1286.)

Big Ship Yard

Will Be Put in Condition and Operated by a New Company

Another large merchant shipbuilding yard for the Atlantic Coast is assured by a transaction just closed whereby a syndicate of New York shipping men represented by Charles P. M. Jack, consulting engineer, 17 Battery Place, New York City, has acquired the shipbuilding half of the old Roach shipyard at Chester, Pa. The parties interested in this enterprise have not been made public, but it is stated papers of incorporation under the laws of Pennsylvania now are being prepared and this step will be taken shortly. The Roach yard has been inoperative for several years. It has a frontage of 700 feet on the Delaware river and the ways are of sufficient size and in such a condition it is said, to permit, with limited repairs, the construction of the largest sizes of merchant boats within a few months. In the days of its activity, this yard built numerous large vessels. Mr. Jack states that the work of remodeling and renovating the property will begin without delay and that the company soon will be bidding upon the large amount of new tonnage that now is flooding the eastern market.

Too Busy to Take War Orders

Wellsville, N. Y., June 15.—The Kerr Turbine Co., of this city, has been offered a large war contract, but has decided not to accept it, as the plant of the company is extremely busy, working night and day, on regular orders for its steam turbines and reduction gears. The officers of the company state that they have no inclination or reason for going into war business.

Death of Chas. L. Gilpin

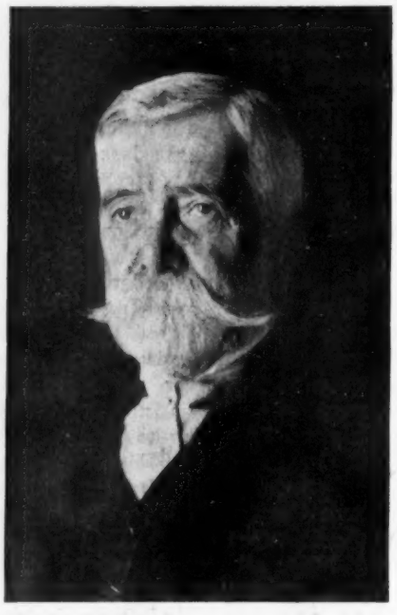
Charles L. Gilpin, widely known for over half a century in iron and steel circles, died after a brief illness at Haverford, Pa., June 7, 1915. He was 88 years of age, having been born at Wilmington, Del., Sept. 3, 1827.

Mr. Gilpin was for many years associated with Alan Wood & Co., iron and steel manufacturers, Philadelphia, and subsequently with W. D. Wood & Co., Ltd., Pittsburgh, and their successors, the W. Dewees Wood Co., McKeesport, Pa., developing the special products of the latter company. In the early eighties, and for many years subsequently, he was regarded as an authority on tariff legislation, and rendered valuable service in connection with the efforts of American manufacturers, which resulted in the establishment of the tin plate industry in the United States. He was exceptionally well informed on subjects related to the iron and steel business, particularly the sheet metal industry. He was associated in 1900 with the executive department of the American Sheet Steel Co., retiring from active business about five years later.

One nephew, Richard G. Wood, is now president of the Alan Wood Iron & Steel Co., Philadelphia, and another, Thos. D. Wood, is a director of the same company.

Will Complete Plant

Construction work on the new benzol plant in connection with the by-product coke works of the Carnegie



CHARLES L. GILPIN

Steel Co., at Farrell, Pa., which has been delayed, is to be completed by the engineers of the Steel Corporation. It was thought originally that the plant would be ready for operation by this time. The installation of the benzol plant at Farrell is being made under the patents of Carl Still, of Recklinghausen, Germany, and the construction was undertaken originally by the Carl Still Co.

Good Time Planned.—The Pittsburgh Foundrymen's Association will hold its last meeting of the year June 21 at the Westmoreland Country Club, near Verona, Pa., where a picnic will be enjoyed. Members will go to the club in special automobiles. A baseball game between iron foundrymen and steel foundrymen will be one of the features of the program.

Still Growing

Statistics Show Increase of Exports of Iron and Steel

Statistics collected by the bureau of foreign and domestic commerce for April show that the exports of iron and steel products reported on a tonnage basis amount to 223,236 tons,

IRON AND STEEL EXPORTS, GROSS TONS.

	April,		Ten months, ending April,	
	1915.	1914.	1915.	1914.
Scrap	6,805	3,883	21,500	63,273
Pig iron.....	16,182	13,039	89,902	177,375
Billets, ingots, and blooms of steel....	41,321	4,997	123,026	34,928
Wire rods....	14,967	7,001	69,066	37,348
Steel rails....	10,991	27,112	105,394	309,793
Steel bars....	20,228	9,672	139,107	127,826
Iron bars....	3,054	324	7,678	9,607
Struc. iron and steel.....	12,564	19,864	131,540	265,677
Hoop, band and scroll.....	1,826	1,172	11,501	9,795
Sh'ts & plates	26,795	31,423	208,499	317,666
Tin and terne plates.....	9,083	5,345	65,209	35,398
Barbed wire.	16,720	6,911	105,282	67,713
All oth. wire	16,981	6,809	99,879	70,356
Cut nails....	421	326	1,852	3,513
Wire nails...	5,043	3,040	38,831	31,190
All oth. nails includ. tacks	487	257	3,463	2,647
Pipes & fit'gs.	16,255	18,162	137,783	206,535
R. R. spikes	250	725	4,618	6,797
Bolts, nuts, rivets, wash.	1,322	1,616	10,746	17,090
Horseshoes	1,781	110	9,195	1,055
Cast radiat...	160	163	2,320	4,763
Total 223,236		161,951	1,386,391	1,800,345

compared with 174,311 tons in March, 1915, and 161,951 tons in April, 1914. Exports of semi-finished material last April amounted to 41,321 tons, compared with 26,410 tons in March, 1915, and only 4,997 tons in April, 1914.

IRON ORE IMPORTS

	April,		Ten months ending April,	
	1915.	1914.	1915.	1914.
Spain	6,266	6,256	52,381	61,468
Sweden	23,887	18,725	167,396	265,944
Canada	268	137	36,835	140,335
Newfoundland Labrador...	...	7,800	17,500	157,325
Cuba	61,140	73,811	620,181	1,144,513
Oth. countries	...	5,083	81,272	83,771
Total	91,561	111,812	975,565	1,853,356

Steel bar exports last April amounted to 20,228 tons, compared with 17,296 tons in March. Exports of wire products also increased.

Imports of iron ore in April amounted to 91,561 tons, compared with 88,402 tons in March.

Busy Plant.—The Sterling Wheelbarrow Co., West Allis, Milwaukee, Wis., says there isn't any such thing as hard times anywhere around its establishment. Last fall it completed a 7,500-square foot enlargement to its flask department and the increase of business since then has been such as to necessitate a second addition of the same size, which will be started at once. The company says May, 1915, is record month, and hastens to explain that this is normal domestic business and not war orders.

Money and Iron: Fact and Comment

Bryan's Resignation Causes Temporary Depression in Stocks, But Nearly All Show Gain for the Week

FOR nearly 20 years, that is, since he was nominated for the presidency in 1896 on the 16 to 1 free silver issue, William J. Bryan has been regarded as a menace by the business interests of the country, and yet, strangely enough, last Wednesday, the first day after his self-elimination from the cabinet, Wall street was somewhat worried at first and feared that his going meant that the President had written an ultimatum to Germany. Early Wednesday morning there was a general decline of from 1 to 5 points and on the whole the day was a rather gloomy one on Wall street. Thursday morning the market moved upward, as Wall street had come to believe that the note to Germany would not be as fierce as Bryan's resignation indicated. Friday, following the publication of the note, Wall street was happy and the market was buoyant. Gains generally were from 1 to 2 points, and in some cases as high as 5. Bethlehem reached a new record of 169½. Saturday the market continued buoyant, although the dealings were not as broad as on Friday. On the whole, the week was a good one for industrial stocks which, almost without exception, scored advances.

Quotations at the close of business June 12 and changes in the leading stocks identified with the iron and steel industry for the week are shown in the following table:

Amer. Brake Shoe & Fdy. Co. Cfts.	100	—2⅛
Amer. Brake Shoe & Fdy. Co. Cfts., prfd.	150	0
American Can	46⅝	+4⅞
American Can, prfd.	103½	+3½
Amer. Car & Foundry Co.	56	+2½
Amer. Car & Foundry Co., prfd.	116	+3
American Locomotive	49¾	+1⅝
American Locomotive, prfd.	95	+1¾
American Steel Foundries	35	+2
Baldwin Locomotive	58⅞	+8⅞
Baldwin Locomotive, prfd.	105⅛	+1⅝
Bethlehem Steel	167½	+19
Bethlehem Steel, prfd.	120½	+3¼
Colorado Fuel & Iron	32	+1¾
Continental Can	64	0
Continental Can, prfd.	97½	+1
General Electric	172⅞	+8⅞
International Harv. of N. J.	104	—2
Inter. Harv. Corp.	62½	—2½
Inter. Harv. Corp., prfd.	.....	.....
Nat'l. Enamel'g & Stamp. Co.	17¼	+1¼
Nat'l. Enamel. & Stmp. Co., prfd.	.....	.....
Pressed Steel Car.	48⅞	+1⅛
Pressed Steel Car, prfd.	97	—2
Pullman Palace Car	162	+4½
Republic Iron & Steel Co.	30	+1½
Republic Iron & Steel Co., prfd.	87½	+1½
U. S. Cast Iron Pipe & Fdy.	15⅝	+1¼
U. S. Cast Iron Pipe & Fdy., prfd.	.....	.....
United States Steel	60¾	+1¼
United States Steel, prfd.	109	—1½
Westinghouse Mfg.	98¼	+1¾

The first important step in cleaning up the financial affairs of J. V. Thompson, president of the First National Bank, Uniontown, Pa., and coal land owner, was taken a few days ago when his receivers, J. P. Brennen, W. G. Laidley and A. Thompson, asked the appointment of three appraisers. The court appointed Julian Kennedy, of Pittsburgh; R. M. Hite, of Fairmont, W. Va.; and R. C. Crawford, of McKeesport, Pa., to act as appraisers. All three men are well known in the steel and allied trades. It is understood appraisers will inspect properties of Mr. Thompson in Ohio, Pennsylvania and West Virginia at an early date.

Corporation Earnings

Latest available figures place the number of stockholders of the United States Steel Corporation at 141,685; the number of common stockholders as of June 1 was 55,917, which compares with 56,825 in March; 52,785 in December, 1914; 47,695 in June, 1914; and 39,679 in March a year ago. The number of preferred stockholders as of May 6 was 85,768, which compares with 85,912 in February last, 80,403 in May, 1914, and 74,598 in May, 1913. Aside from the falling off of the last three months the number of individual stockholders of the Corporation has steadily increased in recent years. Foreign liquidation has not been as heavy as might have been reasonably expected.

Railroad Earnings

The interstate commerce commission has issued a statement covering the returns for the million dollar and over railroads in the United States for the month of April, so far as they have come in to date—167 in all.

For the month the gross operating revenue is reported at $223,054,290, as compared with $227,614,158 for the corresponding month in 1914; on the other hand, the operating expense shows a decrease from $170,760,143 to $158,743,843 this year, and for a mileage which had increased from 213,316 miles to 215,390. The net revenue from railroad operations for the month was $64,312,447, as against $56,854,625 for April of 1914. The gross revenue per mile was $1,067 in April, 1914, and only $1,035 this year; expenses fell from $800 per mile to $737, leaving the net revenue showing an increase from $267 to $298 per mile.

For the entire United States there is an increase in mileage for the 10 months ending April 30, from 212,867 in 1914 to 215,082 this year. The gross operating revenue for the 10 months of the present year is reported at $2,312,034,296, as compared with $2,472,552,145, for the corresponding 10 months of 1914; and, despite the fact that the total expenses show a decrease from $1,787,006,261 to $1,629,773,728, there is still a decrease in the net revenue from $685,545,884 to $682,260,568. Revenues per mile of road operated decreased from $11,615, to $10,749 and expenses from $8,395 to $7,577, leaving the net revenue per mile for the 10 months just ended of $3,172 per mile as compared with $3,220 last year.

Ewald Reorganization

The Ewald Iron Co., of Louisville, control of which has been purchased by R. Baylor Hickman and associates, will be organized as a Delaware Corporation with $1,500,000 capital stock, $1,000,000 being common and $500,000 7 per cent preferred stock. Officers of the corporation are R. Baylor Hickman, president; A. T. Hert, vice president, and Lawrence Jones, chairman of the board. The company plans to make considerable improvements in its rolling mill, but is not ready to announce these. Mr. Hickman, who is largely interested in the Hickman-Williams Co., a pig iron concern, will devote all of his time to the Ewald Iron Co. The head of the Louisville office of the Hickman-Williams Co. is Frank A. Botts.

Financial Notes

The International Harvester Co. of New Jersey has declared the regular quarterly dividend of 1¼ per cent on the common stock, payable July 15 to stock of record June 25.

The Phelps-Dodge Co. has declared the quarterly dividend of 2½ per cent and an extra dividend of 3 per cent payable June 30 to holders of record June 18.

Although the papers have been filed in the dissolution of the Amalgamated Copper Co., Amalgamated shares will not be stricken from the New York stock exchange list until a majority of this stock has been exchanged for Anaconda Copper Mining stock.

Spelter Price Declines

Galvanizers Staying Out of the Market—
Tremendous Demand for Lead

New York, June 16. (By wire.)—Attorney General Barker, of Missouri, filed information in the Missouri supreme court yesterday, naming 28 companies suspected of unlawfully controlling zinc ore prices. He asked the appointment of a commissioner to take testimony.

New York, June 15.—The metal market the past week has been somewhat inconsistent in its general behavior; while some metals reflected great activity and price increases, others were dull and declined. Lead has been the most interesting metal. With a tremendous volume of demand in the market, the independent producers have sold at heavy premiums over the American Smelting & Refining Co.'s price. The latter interest has been slow to advance its price and, in fact, in most cases, has refused to quote. On Saturday, this producer advanced its price to 7c, New York, and since then has not changed. In the meantime, the independents have booked business at as high as 8c, St. Louis. In view of this peculiar condition, the trade is rather uncertain as to what the next step will be. In some quarters, it is claimed, most of the buying of late has been of a speculative character. Demand today shows a falling off.

Copper has registered further advances as the result of domestic buying. Electrolytic is held at 20.50c, delivered 30 days. Best brands of casting copper are held at around 20c, delivered 30 days, while cheaper casting is quoted at about 19.50c to 19.62½c, cash. Best brands of lake are held at 22.50c to 23c, cash, ordinary grades at 20.50c to 20.62½c, cash, and arsenical brands at 20.50c, cash.

Spelter has declined sharply, and the reason some producers give is that galvanizers have offered to re-sell prime western at heavy concessions. The real reason, it is thought, is that some producers are short on ore and accordingly are depressing the spelter market in order to bring about lower ore prices. Prime western for spot shipment is quoted by these producers at 22c to 23c, June at 21c to 22c, July at 20.50c to 21.50c, August at 20c to 21c, St. Louis, etc. No transactions are reported at these figures and it is doubtful whether they could be done on large quantities. Practically the only real weak spot in the market is that galvanizers are staying out of the market; it appears these interests are turning on an increasing scale to lead and other coatings to be used as a substitute for spelter on steel sheets. The price of sheet zinc has been reduced to 30c, a reduction of 3c. It is impossible to quote brass special. Demand today from abroad and from domestic brass mills is somewhat better.

The tin market reflected great activity during the week; in fact, during one day early last week more tin changed hands than ever before in one day. At present, the market is quiet but firm, as it is believed a great deal of tin still remains to be bought. A feature is the premium asked on spot; this is due to the uncertainty attendant upon future shipments. Spot now is selling at 42c, which is nearly 3c higher than the cost of importing at today's London price. June is held at 40.75c to 41c, July at about 38.50c, August at 37.50c.

The aluminum market is very strong and the metal is scarce, due to the extent to which the domestic producer is sold ahead, and to the fact that very little aluminum is being imported. Second sellers have sold carload lots of No. 1 ingot at 32c, and less-than-carload lots at 35c.

Antimony is quiet. Spot Chinese and Japanese are quotable at about 36c to 37c, duty paid. Futures are offered at prices figuring out to around 37c to 37.50c, duty paid.

Higher at St. Louis

St. Louis, June 14.—Lead again is strong and higher, following an advance of $5 a ton in New York. Bids in St. Louis today were from $7.25 to $8, whereas the local price usually is 12½ cents lower than New York quotations.

Spelter is unsettled, prices running from $20 to $25 a ton, according to delivery. There was no spot spelter quoted.

Not Yet Ready to Combine

William H. Donner, president of the Cambria Steel Co., has informed a representative of *The Iron Trade Review* at Philadelphia that there is no basis for the newspaper statements of the past few days that the consolidation of the Cambria Steel Co. and the Pennsylvania Steel Co. is about to be consummated. Mr. Donner says that the board of directors of neither company has taken any action leading toward a merger of the two companies.

Car Orders

Include 3,500 From France—Frisco Receiver Order Rails

New York, June 16. (By wire.)—Further attractive orders for rails and railroad equipment for foreign countries have been closed. The French government railways place 3,500 cars with builders in this country and Canada. The report that France has placed 50,000 tons of rails here refers largely to the aggregate of various orders previously announced. France still is figuring on rails. The recent order for rails for the Chinese Eastern railroad placed with the Corporation, it is now learned, was for 17,000 tons. Cuba asks for 7,000 tons of rails.

The receivers of the St. Louis & San Francisco have placed 21,000 tons of rails with the Tennessee company. The Rock Island is closing today for 4,000 box cars.

In Market for Coke

Pittsburgh, June 16. (By wire.)—The Pittsburgh Steel Co., which has blown in its second stack at Monessen, is quietly figuring in the market for 20,000 tons a month of last half furnace coke. The Wheeling Steel & Iron Co., Wheeling, W. Va., last week closed for 8,000 tons of furnace coke per month, but it is not known at what price the fuel involved was obtained.

Steel Corporation Activities

New York, June 16. (By wire.)—The United States Steel Corporation and other large makers are now naming 1.25c on plates, shapes and bars, both for prompt and third quarter. The Corporation's bookings are maintained around 40,000 tons daily. Operations are 80 to 85 per cent of ingot capacity.

William A. Sproull, for the last 25 years traffic manager of the Cambria Steel Co., Johnstown, Pa., has resigned to take charge Aug. 1 of the bureau of transportation and traffic of the chamber of commerce of Philadelphia.

James A. Farrell, president of the United States Steel Corporation, who has been on a western trip for six or eight weeks ending on the Pacific Coast, has returned to New York.

(For complete prices see page 1286.)

How New Forge Plant is Equipped

Description of Nut, Bolt and Rivet Shop of Upson Nut Co. With Details of Arrangement and Equipment

BY R. V. SAWHILL

IN THE summer of 1912, the Upson Nut Co., Cleveland, began work upon a comprehensive plan of reorganizing and modernizing its nut and bolt departments. The first step was the construction of a new forge shop partially upon the site of the old works. This unit, together with a six-story office building, has just been completed.

The rebuilding of the forge shop was complicated by the necessity of keeping practically the full quota of machines in operation while the new plant was being erected. After considerable study, the engineers for the Upson company solved this problem by utilizing all of the available space in the southern half of the old forge shop and building the northern half of the new plant as a separate unit.

When the first half of the new building was completed, all of the machinery, possible to operate, was installed and the work of building the southern half of the building started immediately. It is this portion which has just been completed. Present plans call for beginning work shortly upon the construction of a six-story building, 450 x 180 feet, to house the finishing, shipping and packing departments.

The new forge shop is 620 feet long, and 180 feet wide for more than three-quarters of its length. At the northern end, it tapers on one side to a width of about 130 feet. The size of the building can be realized, when it is pointed out that there are about 100,000 square feet devoted to the manufacture of rivets and the first operations on nuts, bolts, track bolts, machine and carriage bolts. This space will be still further increased when the new finishing building is constructed, as the 30-foot bay which directly adjoins this building will not be completed until work is started upon the finishing department.

The new building is of steel construction, having a saw-tooth roof covered with cement tile. The lower curtain wall is of brick, 8 feet in height, supporting glass which reaches to the crane rail. Topping this glass is a strip of metal and two more rows of glass windows. From north to south, the shop is divided into 20 30-foot bays, and one 20-foot bay and by reason of the saw-tooth type of roof construction, the plant at all times has an abundance of daylight illumination.

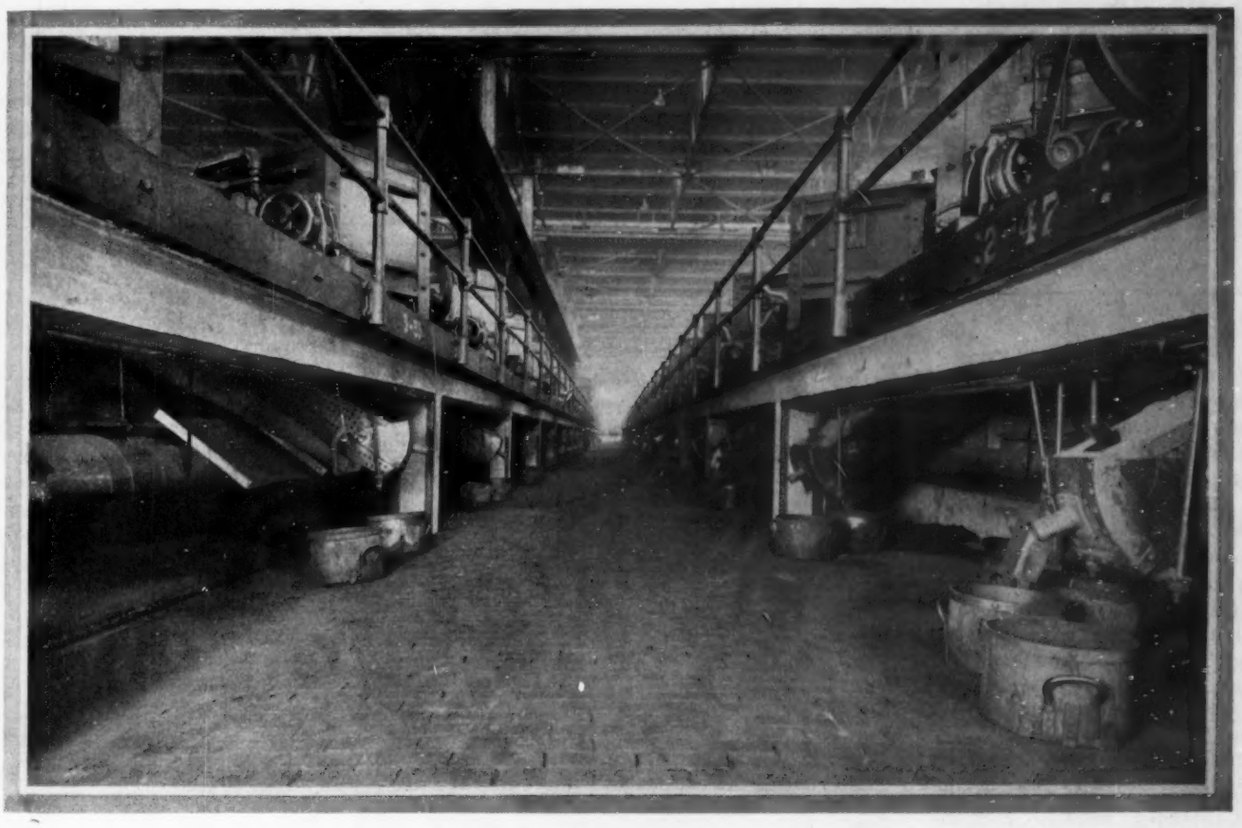


FIG. 1—AISLE BETWEEN NUT PLATFORMS SHOWING CHUTES AND RECEPTACLES

The general arrangement of the forge shop is shown in Fig. 2. The depressed track shown at the upper right hand, enters the building at the north-west corner, and gives a standard gage track connection with the open hearth and mill departments. The telpher system which has been installed in the forge shop is also used for transporting materials from the other departments. The crane which serves the west aisle is used for handling material from cars to the stockpiles directly adjoining. All stock for the nut and bolt machines is carried beside the southern end of this depressed track, the remainder of the

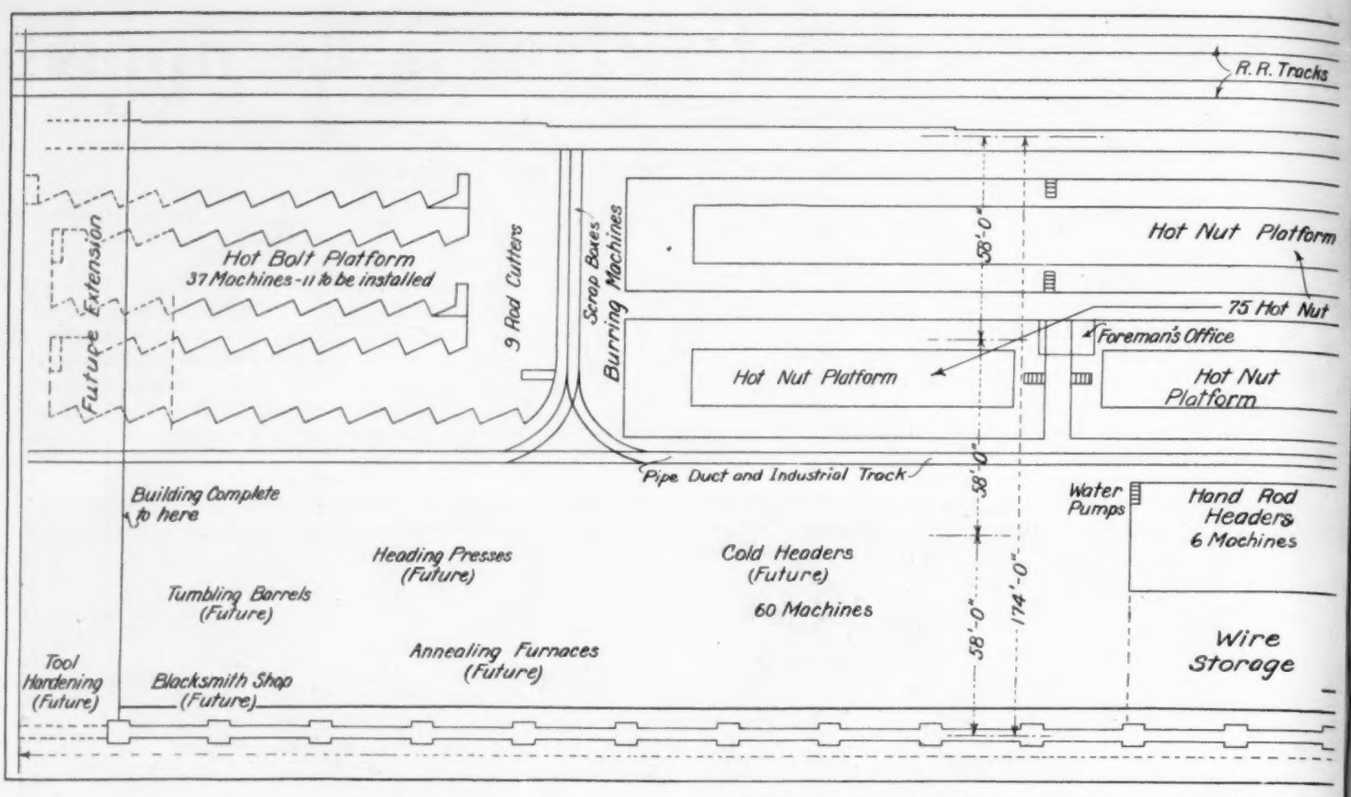


FIG. 2—GENERAL ARRANGEMENT OF NEW FORGE SHOP

space adjoining being used for rivet sorting, kegging and shipping. Stock for the continuous headers is carried from the cars by the telpher and stored directly behind the furnaces.

The forge shop is divided into three main 58-foot aisles running the length of the building. The west aisle contains the hot pressed and forged nut machines, rod cutters and hot bolt machines. The east aisle contains the hand rod and continuous hot headers, the furnaces for serving these machines and the necessary stock. The southern half of this aisle at present is used for carrying finished stock. When the new finishing building is erected, this half will be occupied by cold headers, heading presses, annealing furnaces, tumbling barrels and the tempering room. The center aisle contains portions of the bolt and nut platforms, hot and cold headers and an industrial track.

There are 75 machines for making hot pressed and forged nuts. These machines with the necessary furnaces, are located on three raised platforms in the western half of the shop. As shown in Fig. 2, one platform is approximately 303 feet long, the second 172 feet, and the third 123 feet. Between the two smaller platforms is an aisle over which the foreman's office is located and under which is the main cross connecting duct for carrying air, oil and steam piping and electric conduits, as shown in Fig. 4, connecting with the main duct under the industrial railway shown in Fig. 3.

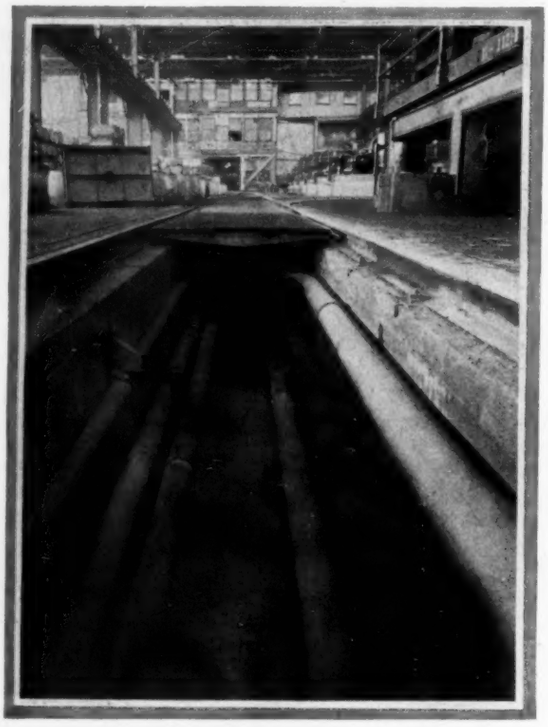
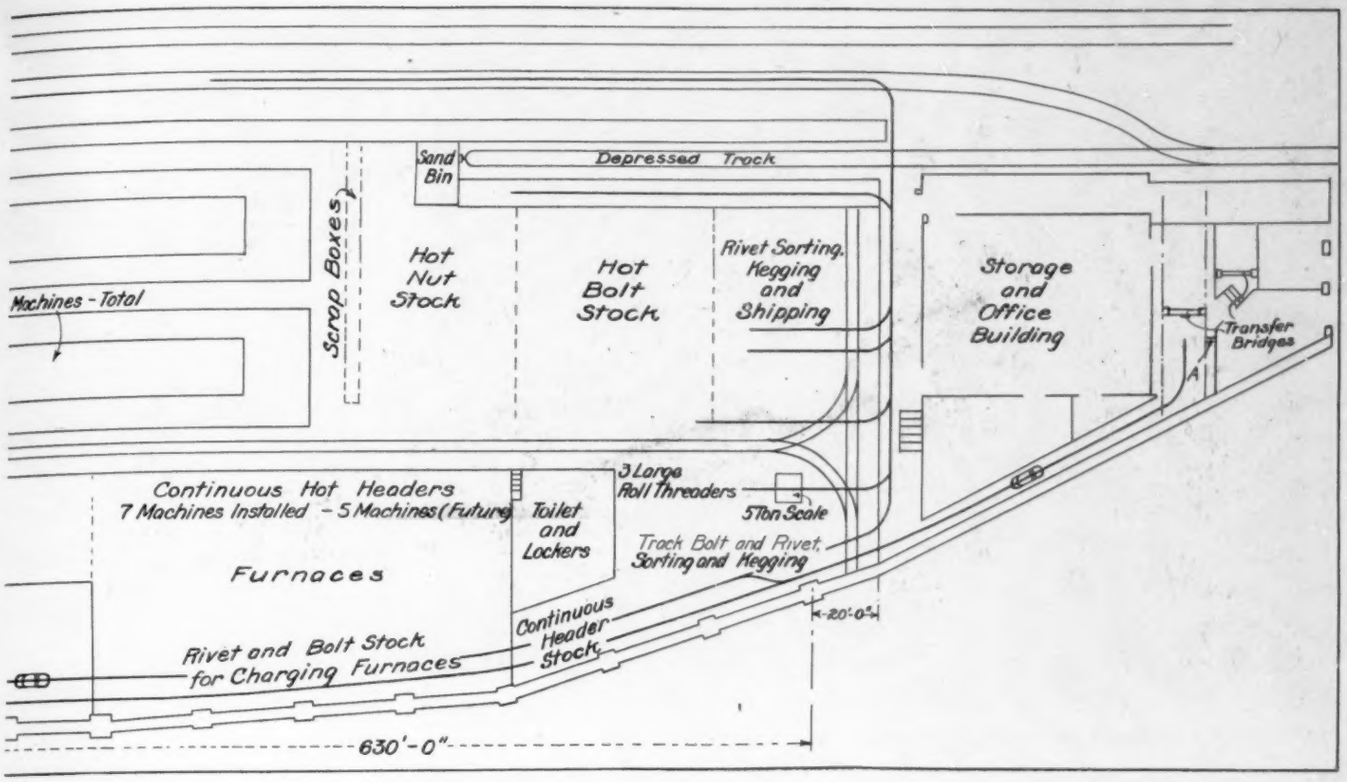


FIG. 3—MAIN DUCT CARRYING PIPING AND RAILROAD TRACKS

The platforms on which the nut machines are carried, are of a type new to forge shop construction and were designed by the company's engineers to facilitate the handling of the finished nuts. The platforms are elevated 5 feet above the floor level. The central portion of each platform is filled with dirt and cinders to the floor level, being used for carrying stock and for machine operators to stand on. The sides of each platform, on which the machines and furnaces are carried, are floored with reinforced concrete, supported by concrete columns. This arrangement provides ample space for the chutes which discharge the nuts at the main floor level. As shown in Fig. 1, sufficient room also is provided for carrying the conduits and the various pipes supplying water, oil and air. By this arrangement, these pipes are carried out of sight, do not occupy a space which otherwise could be used for manufacturing purposes and are protected from injury. The stock for each platform is carried at the end of that platform. The stock for the nut and bolt machines is



SHOWING LOCATION OF THE VARIOUS DEPARTMENTS

handled by crane direct from the cars to storage. Facilities are provided for weighing and storing this stock in five-ton bundles, held together by chains as shown in Fig. 7. In this manner, the crane service is improved by the facility with which these chained bundles can be handled. In addition, the space formerly given over for timber racks is utilized for bundled stock.

When required, a five-ton bundle is picked up by the crane and carried to a cradle at any machine on the hot nut or hot bolt platforms. Each machine operator has no other duty than feeding the stock to the nut and bolt-making machines, as the excellent crane facilities permit each operator's stock to be replenished before the previous bundle has been used.

Most of the nut and bolt machines were designed by the Upson company and were used in the old forge shop. However, the line shafting formerly used to drive these machines has been done away with owing to crane interference, each machine being provided with individual motor drive.

The chutes used for carrying the finished nuts and scrap from the nut machines are shown in Fig. 1. Each machine is provided with two chutes, one discharging into receptacles which handle the nuts, and the other carrying off the scrap. The receptacles holding the nuts have a capacity of 200 pounds each and are loaded on to trays which will handle 24 receptacles. These trays are conveyed by the cranes, to the southern end of the platforms where the hexagon nuts are run through the burring machines and all of the nuts counted and weighed. The hexagon nut machines are at the southern ends of the platforms and these nuts are trucked direct to the burring machines, eliminating crane service previous to burring.

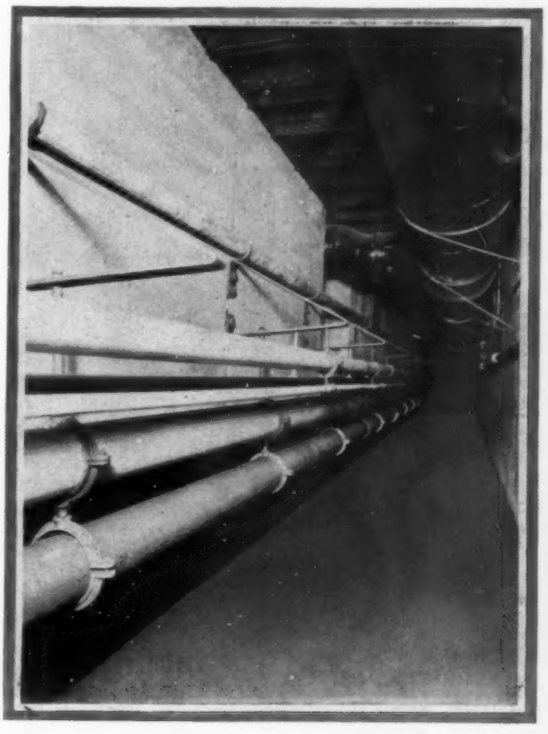


FIG. 4—LATERAL DUCT SHOWING ARRANGEMENT OF PIPING

The facilities for handling these trays are excellent. Three brick paved aisles are provided, one on either side of the platform, and one, 7 feet wide, between the large and small platforms. The scrap is dumped into open hearth charging boxes, carried in troughs at each end of the nut platforms, as shown in Fig. 13. When filled, these charging boxes are loaded by crane on flat cars and transferred direct to the open hearth department for charging in the open hearth furnaces.

At the southern end of the nut platform are seven burring machines, carried at floor level. These machines remove burrs from the hexagon nuts. The nuts are then inspected, weighed and counted on a com-

FIG. 5—BOLT PLATFORM SHOWING ZIGZAG ARRANGEMENT OF MACHINES. RADIATORS MOUNTED ON CRANE GIRDERS ARE SHOWN AT THE RIGHT

puting scale and are sent to the finishing department to be tapped and kegged.

The hot bolt platforms are of ingenious design. As shown in Fig. 5, they have a zigzag arrangement. These platforms are only 30 inches above the floor level, and the space between the main floor and platform levels is walled with concrete, provision being made in ducts under the machines, for carrying the necessary piping.

Bolt Platform Arrangement

The zigzag arrangement of the platforms was adopted to economize space and cost of construction. Each machine and furnace is carried on that portion of the platform which juts out on the main floor, providing a clear aisle between the different platforms for handling cut rods. In the angle between each machine, there is ample space for the wheelbarrows which receive the finished bolts at the main floor level. At the same time, an aisle of sufficient width is left for trucking these barrows conveniently.

The design of the hot bolt platform, is in the form of the letter *E*, the main stem of which runs east to west and is directly contiguous to the rod cutters. The three arms of the letter *E*, represent the rows of bolt machines, the center and east arms having a row of machines on each side. The west arm, being against the wall, has machines on one side only. The stock is handled from the stockpile at the north end of the building, carried over the nut platform by crane and placed at one side of the nine rod cutters. After the stock is run through the cutters, it is discharged at the other side into wheelbarrows and wheeled

FIG. 6—HOW THE TELPHER IS USED

to the machines. The pieces, after being heated and headed, drop by gravity through chutes into the wheelbarrows at the main floor level. They are weighed on scales directly adjoining this platform, and sent to the finishing department to be prepared for shipment.

The equipment for making rivets, track bolts, machine and carriage bolts, is located in the north end of the east and center aisles, as shown in Fig. 2. This equipment, at present, includes seven continuous hot headers and six hand rod headers. Space has been provided for the installation of five additional continuous hot headers. The necessary furnaces for serving the continuous headers are located directly behind the machines, as shown in Fig. 14, and in front of the stockpiles. The stock for the headers is handled by the telpher from cars on the depressed tracks and from the stock piles to the charging racks.

Continuous Hot Headers

Two men are required for operating a furnace and continuous hot header. Through a signal system, the machines are kept supplied with stock at all times. The furnaces handle 24-foot bars which are fed through continuously, from four to 10 being heated at one time. As one bar is run through the header, the man at the rear of the furnace is signaled, and a heated bar is pushed up to the hot header at the same time that a cold bar is shoved into the furnace.

These headers are carried on an elevated platform, of the same general construction as the nut platforms. The finished rivets and bolts are discharged through chutes into 1½-ton dump

FIG. 7—HOT NUT PLATFORM SHOWING HOW STOCK IS BUNDLED TO PERMIT EASY HANDLING

buckets, located in the main aisle at floor level. These buckets are handled by crane, to a five-ton automatic scale located in the north end of the building, as shown in Fig. 2. After being weighed, the contents are dumped on to cooling plates and inspected and sorted. The roll threaders for threading track bolts directly adjoin this scale. The threaded track bolts and rivets are sorted and kegged in the space directly behind the roll threaders and scale, where they are conveniently located for handling to the shipping platform. The machine and carriage bolts are carried by an electric locomotive to scales in the south end of the building, and are then sent to the finishing department. The dump buckets are handled by crane to the automatic scale which is set to allow for the weight of the bucket, and gives the weight of the rivets or track bolts by direct reading.

The six hand rod headers are carried on an extension of the continuous header platform. These machines are used largely for handling small lot orders. The space between this extension and the main wall, about 90 x 40 feet, is used for storing wire and will hold from 1,000 to 1,200 tons.

Oil Furnaces

At the present time, six furnaces are installed for continuous rod heating with space for six additional. Nine furnaces are used for hand rod heating and 74 furnaces for hot nut work. Furnaces from the old shop were installed in the hot bolt department. New burners were provided to use the low pressure air blast in the new shop at 1½ pounds per square inch, compared with 17 to 20 pounds in the old shop. All of the new furnaces and burners were furnished by the W. S. Rockwell Co., New York. New furnaces will be installed in the hot bolt department. Their exact design has not been determined, as the bolt stock is in short lengths and is piled up at the front where the flame heats the end only.

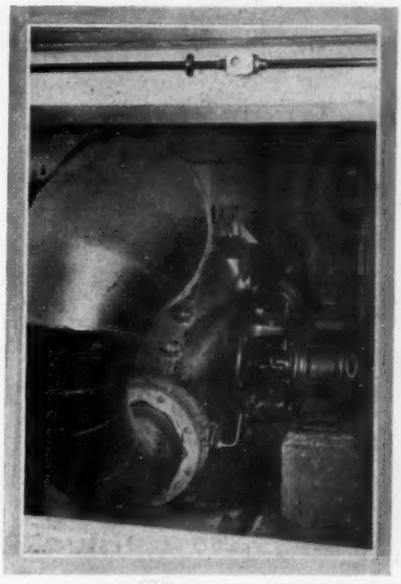


FIG. 8—AIR COMPRESSOR BELOW NUT PLATFORM

In the continuous furnaces, the cold bars are pushed in at one end and the hot bars drawn out from the other end and fed directly into the machine, as shown in Figs. 11 and 12. These furnaces are 25 feet 6 inches long and are used for heating 24-foot bars. They will heat from one to two tons of material an hour, depending upon the size and class of work.

The continuous furnaces are of the box type with burners on both sides, combustion taking place in the chamber above the material. The waste gases pass out of the charging and discharging openings at both ends of the furnace and back over a multitubular preheater through which the air passes before reaching the burners. In this manner the heat passing out of the furnace, which otherwise would be wasted, is utilized and a great portion of it is returned to the furnace through the air blast.

Testing Oil Consumption

The furnaces are not equipped with oil meters, but have a portable oil-testing outfit, which may be attached in a few moments to any furnace. This outfit has two 30-gallon capacity tanks with a graduated gage glass on each, which are alternately filled and the oil forced to the burners through pressure supplied by compressed air, thereby giving an accurate oil consumption reading.

In introducing air for combustion, the amount is controlled by means of a blast gate in the pipe which leads

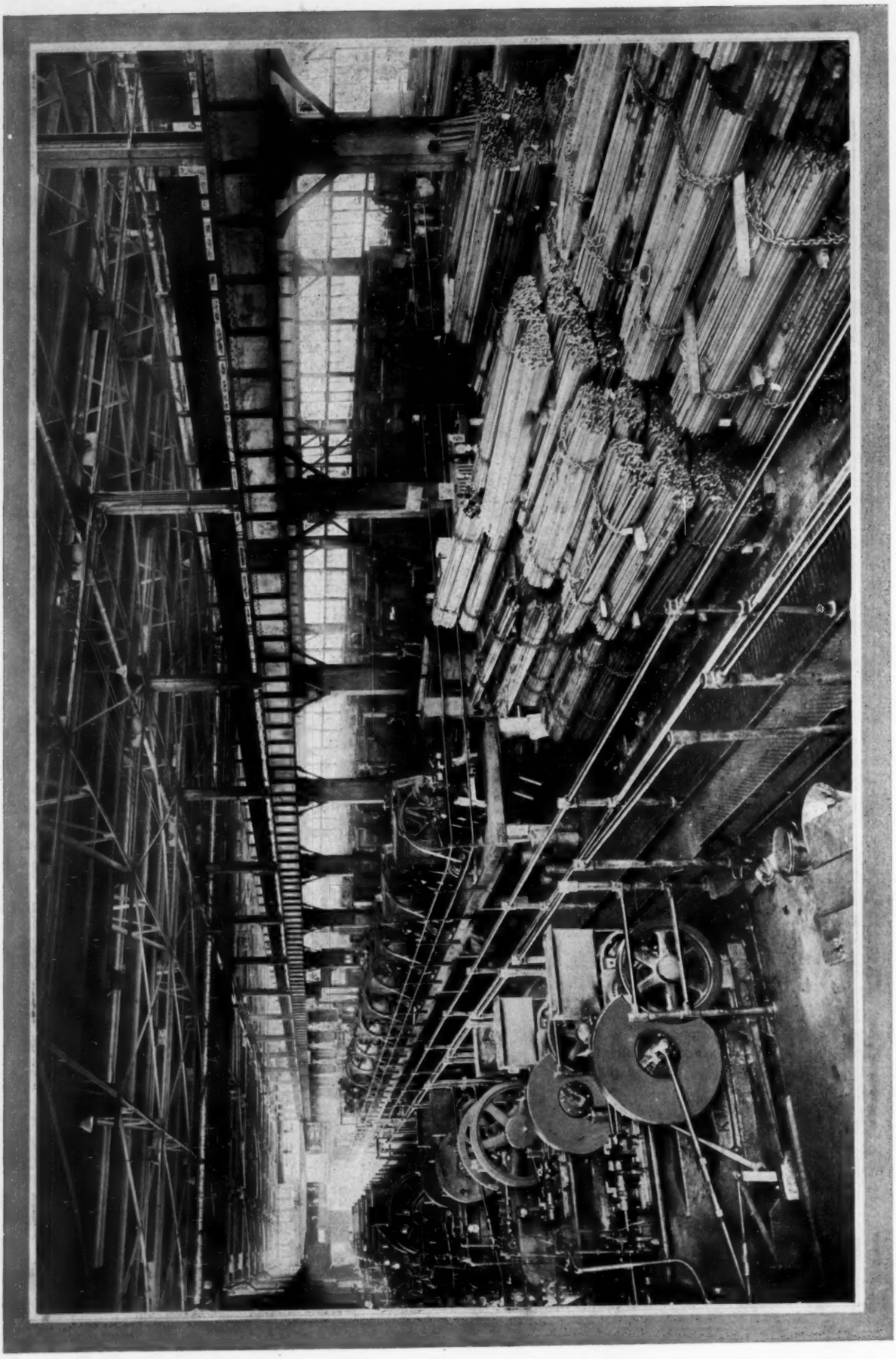


FIG. 9—GENERAL VIEW OF FORGE SHOP SHOWING CONTINUOUS HOT HEADERS IN FOREGROUND AND NUT PLATFORMS IN BACKGROUND. ARRANGEMENT OF RADIATORS AND BUNDLED STOCK IS SHOWN CLEARLY

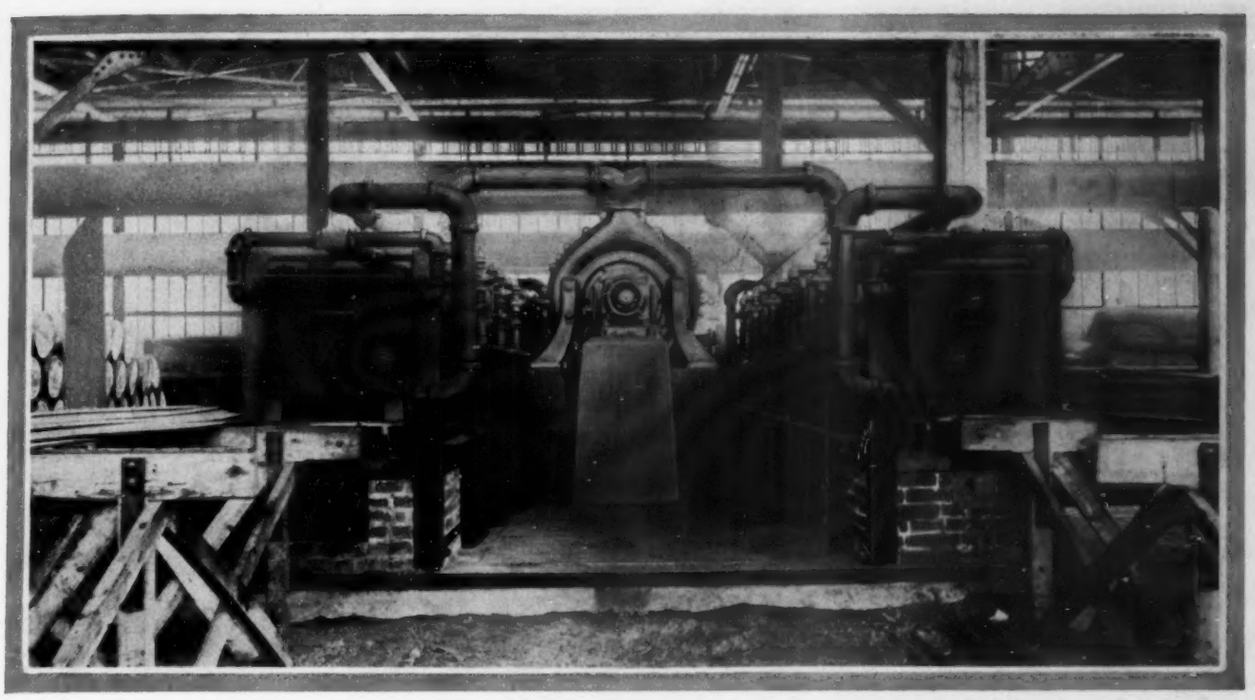


FIG. 10—CONTINUOUS ROD HEATING FURNACE FROM CHARGING END

from the main air pipe to the preheater in front of the hearth. The air then passes through the preheater tubes, where it becomes heated by the outgoing waste gases and is carried by pipes to the burners at each side of the furnace.

Both the large and the small furnaces are of the box type, the material to be heated lying on the bottom of the furnace, the burners being directly opposite on both sides approximately half way between the floor and the roof. The hand rod and nut stock heating furnaces have two burners, one on each side; the continuous furnaces have 10 burners, five on each side. Six of the continuous heating furnaces are of medium size and have oil nozzles on one side only and air on both sides. The furnaces are of the type recently developed by the Rockwell company, a prominent feature being the use of an economizer shield which protects the operator from the excessive heat and allows him to work to better advantage. In addition, this shield recovers a large percentage of the heat ordinarily wasted. Through a novel arrangement, the air blast acts as a barrier between the operator and the escaping heat.

In operation, the spent gases are discharged from the working openings and are deflected by the air blast away from the operator and against the tubes and headers of the economizer, through which the air for combustion is circulated. By this arrangement the air takes up heat in its passage and is delivered hot into the furnace with the fuel. This air blast forms a current of air under pressure in which the operator works. The pressure of the air blast is automatically adjusted to the force of the spent gases escaping from the furnace. The operating valves for fuel and air are controlled from the working end of the furnace and the operator is not required to change his position nor interrupt his productive work in order to adjust the fire. The air entering the furnace is controlled by one valve and passes through the economizer before entering the furnace. The furnaces are of heavy construction.

As stated previously, that portion of the east aisle directly south of the hand rod headers, will be used for housing the 60 cold headers when the new finishing building is constructed. These cold headers, upsetters, trimmers, reheaders and tumbling barrels will be brought from the old finishing building, thus bringing the company's entire equipment for making blank nuts, bolts and rivets within the new forge shop. The tempering room where shop tools are treated, at present is located in the southern end of the east aisle. It includes four small and one large double type furnace, the latter

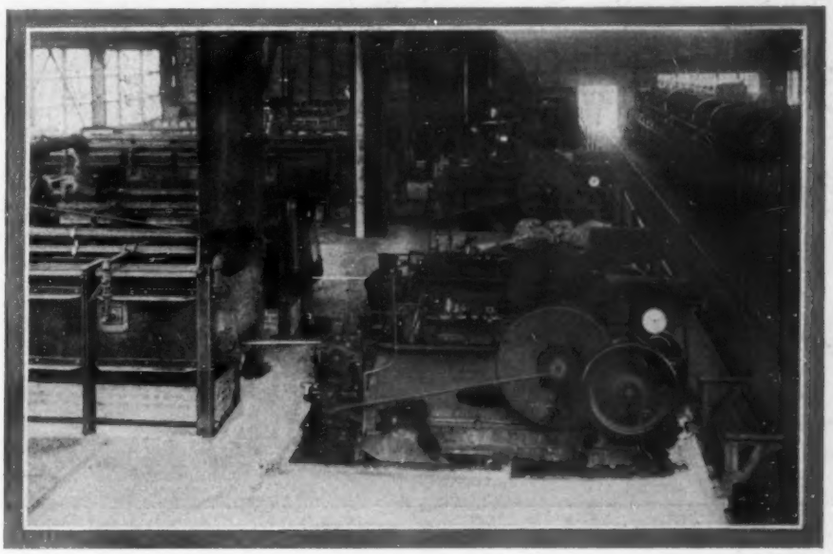


FIG. 11—ARRANGEMENT OF FURNACES AND CONTINUOUS HOT HEADERS

FIG. 12—LONG ROD HEATING FURNACE AND HEADING MACHINE

equipped with a preheating chamber. The other equipment comprises two large oil tempering baths and a lead bath served by an I-beam trolley, three oil quenching tanks, two water tanks and one brine quenching tank. The furnaces are gas fired and are equipped with recording pyrometers and a compressed-air line for air-hardening.

Running through the center of the shop for its entire length, is the large duct shown in Fig. 3. All of the necessary piping, except the conduits carrying the electric lighting lines, and the steam lines for heating, are carried in this duct. It is floored and walled with concrete and supports tracks for carrying an electric locomotive. The duct is covered with steel sections which are readily removed and permit quick access to any part.

The tracks are of 42-inch gage, 60-pound rail. Power for the locomotive is furnished by a storage battery. The locomotive can carry a deck load of five tons and draw three trailers, each of five tons capacity, at a speed of four miles an hour. It is used for handling freight for city delivery and for the general transfer of materials and stock between the forge shop and finishing departments. At the entrance to the finishing department, the tracks divide into two sidings, one for empty and one for loaded cars. At the north end of the building, the tracks run across the full width of the building and through a Y the locomotive can reach either side conveniently. A second spur from the main track, runs in the aisle between the nut and bolt platforms and is used for handling

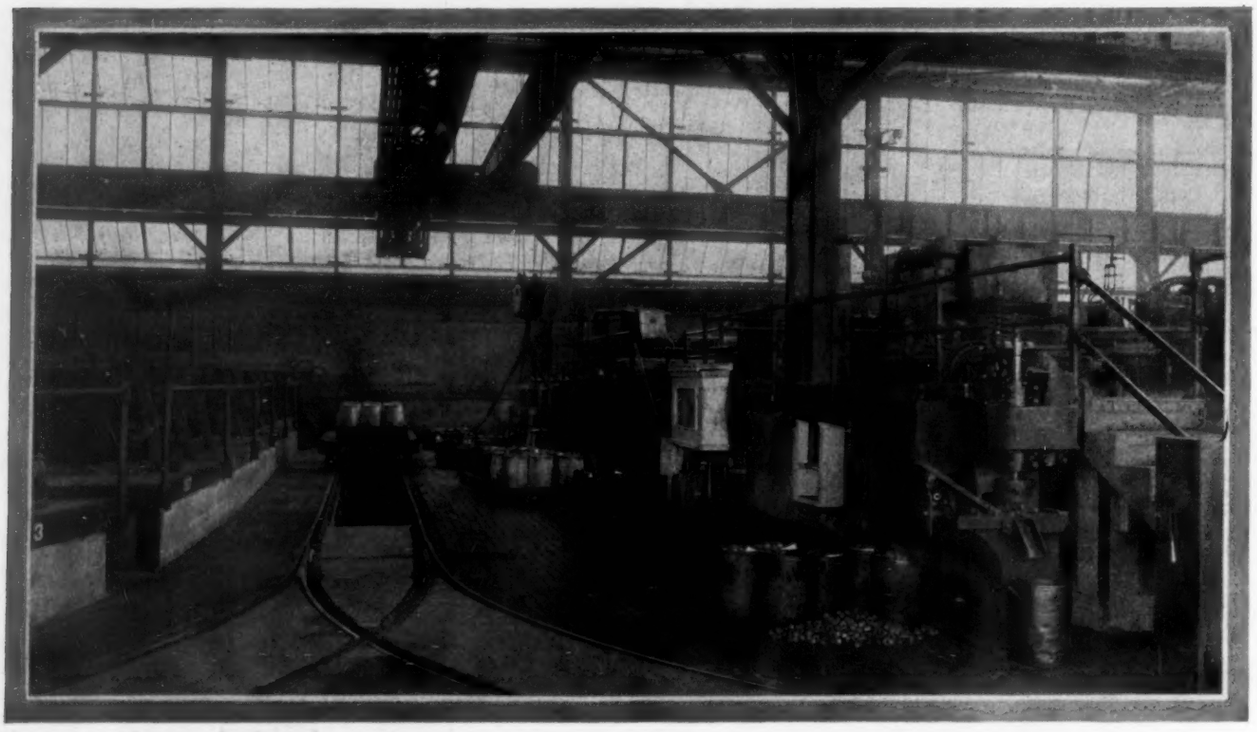


FIG. 13—INDUSTRIAL TRACK BETWEEN NUT AND BOLT PLATFORMS. VIEW SHOWS OPEN HEARTH CHARGING BOXES FILLED WITH SCRAP, A CRANE HANDLING LOADED TRAY AND THE AUTOMATIC SCALE

nuts from the burring machines and scales to the finishing department.

The floor of the forge shop is a 6-inch layer of reinforced concrete covered by a 2-inch sand cushion and paved with brick. The forge shop building was designed by Anton Burchard, Cleveland, who died, however, previous to its completion. The McMyler Interstate Co., Bedford, O., had the general fabricating contract. The steel sash was furnished by David Lupton's Sons, Philadelphia. The cement tile roof was laid by the Federal Cement Tile Co., Chicago, while the steel siding was furnished by the Asbestos Protected Metal Co., Pittsburgh.

Facilities for handling materials are exceptionally complete and include a monorail system, three traveling cranes and two transfer bridges. The telpher is used to carry stock from cars to storage, to place bundles of stock on the rack behind the continuous heating furnaces, and to carry the finished products to the shipping platform.

The monorail track, as shown in Fig. 2, runs into the three crane bays at a height sufficient for the trolleys to pass over the crane bridges. Thus at the north end of the bays, the floor space is served by both cranes and monorail and material is readily interchanged between the two systems. At *A*, Fig. 2, a similar relation exists between the monorail system and one of the transfer bridges. The transfer bridge trolley can run from one bridge to another by locating them opposite a short piece of fixed track. This arrangement permits material to be handled direct from the forge shop to trucks or wagons under the transfer bridges.

For local shipping by team or truck, the finished products are loaded on large flat trays as shown in Fig. 6, and carried by the telpher through the shop and office building and placed on the floor, where one of the transfer bridges picks up the load and brings it over the truck.

The monorail trolleys are of five tons capacity. Each is provided with a hoisting mechanism of the four-point suspension type, so that the tray will not tip appreciably regardless of the method of loading. When carrying bundles of bars, the tray is unhooked and a lifting beam is attached to the frame which hangs on ropes. A swiveled arrangement of the beam permits bars to be carried either parallel or at right angles to the monorail track. A lock is provided to prevent the beam swiveling accidentally. An ingenious system of electrical interlocking prevents a crane or telpher entering the north end of a bay which already is occupied by a telpher or crane respectively.

The monorail trackage is 1,607 feet in length. There are six track switches of a type which permits a telpher to run through in any direction without stopping. They consist of two steel castings bolted together, no moving part being used.

In use, if the operator desires to take the spur track, he pulls a lever conveniently located in the operating cage of the trolley. This raises a heavy vertical pin in front of the leading truck. This pin has a roller at its upper end which engages with a curved rib on the lower side of the switch and diverts the truck to the spur track. If the operator does not pull the lever the trolley runs through the switch on the main track. The cranes, monorail system and transfer bridges were manufactured and installed by the Shaw Electric Crane Co., Muskegon, Mich.

Steam for heating the shop is carried by a steam line 1,100 feet long, at 150 pounds pressure, from the steel works boiler house. The steam is led through the heating coils in the building by a vacuum pump system, being reduced to 10 pounds pressure for heating by an automatic reducing valve. The temperature in the forge shop is maintained at 45 degrees Fahr. in zero

FIG. 14—ANOTHER VIEW IN CONTINUOUS HOT HEADER DEPARTMENT

weather, the heat radiating from the furnaces being sufficient to keep the plant comfortable at all times.

In order to economize space, the radiators are carried on the side walls and also over the crane girders. The latter serve the double purpose of heating and of protecting the workmen from injury. Through their arrangement on the crane girders, they prevent workmen stepping from one crane runway to another. As a further precaution, two strands of barbed wire are carried on top of the radiators. The arrangement of the radiators and wires is shown clearly in Figs. 5, 7 and 9. The water condensed from the heating system, is forced by a discharge pump into a large settling tank located under the hand rod headers.

Steam is carried to the oil storage house in a 2-inch pipe, at 150 pounds pressure. The pipe ends in a fusible link valve, which in case of fire would automatically release the steam and fill the oil house. The steam also is used in the various toilet rooms for heating water, and for heating the office building.

Water System

The pipes for carrying water to cool the tools on the hot machines, are so arranged that either city water, water from the large settling tank, or a combination of the two can be used, thus insuring a plentiful supply of water at all times. The water drained off the machines falls into drainage ditches and is led to the settling pit. Here the scale falls to the bottom, the oil rises to the top and clean water is pumped back into the feed lines. Circulation of the water is secured through two centrifugal pumps having a capacity of 400 gallons a minute under a 100-foot head. These pumps are located at the end of the extension to the header platform.

Oil System

Oil is stored in three iron tanks in a concrete oil house sunk below ground level near the forge shop. The tanks have a combined capacity of 72,000 gallons. The oil is forced through a 4-inch pipe running the entire length of the plant in the duct, Fig. 3, and the excess is returned to the oil house through a 3-inch line. The oil is circulated by means of two motor-driven rotary gear pumps each of which has a capacity four times in excess of the normal requirements to maintain a constant circulation. The two pumps are so arranged, that one is kept in operation and one held for emergencies.

The branch lines to the different platforms, lead from the 4-inch supply line. These branches run under the platforms for their entire length, and lead back to the return line. Single lines connect these branches with the oil-burning furnaces.

In the oil house at the end of the 3-inch return line, is an adjustable relief valve which permits any pressure to be maintained in the main supply line. For unloading the oil from tank cars, a centrifugal pump having a capacity of 500 gallons per minute is provided. The oil house, however, is so located that the bottom of the tank cars is from two to three feet higher than the oil tank level, permitting the unloading of the oil by gravity when desired. The centrifugal pump can also supply the forge shop in case both rotary pumps break down.

Air for supplying the furnaces and the tempering room is furnished at 1.5 pounds pressure by four 50-horsepower centrifugal air compressors. These compressors are so arranged that they can run independently or collectively. In ordinary practice, three are in use and one is held for emergency. These compressors are located under the ends of the hot nut platforms, as shown in Fig. 8.

The continuous furnaces for supplying the hot headers, are supplied with air by 10-horsepower compressors. One compressor supplies two furnaces and is situated between each pair of furnaces. The large compressors have a capacity of 5,400 cubic feet of free air per minute, the small compressors having a capacity of 1,000 cubic feet. For controlling the air supply, a novel air gage, designed by one of the company's engineers, has been installed. This gage is the form of an U-tube, a constant supply of water being maintained in one tube. The water level is kept constant by an overflow at the top of the tube. The pressure of the air in the opposing tube can be read directly, avoiding the necessity for taking two readings and subtracting.

FIG. 15—ARRANGEMENT OF FURNACES, MACHINES AND STOCK ON HOT NUT PLATFORM

Lighting System

The arrangements for providing adequate lighting are unusually complete. All of the current is generated at the steel mill and is led into the forge shop at 440 volts, 3-phase, 60 cycles. For lighting purposes, this current is reduced to 110 volts by three trans-

(*Continued on page* 1286b.)

Progress in Blast Furnace Practice

The Proper Utilization of Heat in Ore Reduction—Results of Exhaustive Test on Isabella Furnace to Determine the Heat Balance

BY A. E. MACCOUN

THE principal objects in the use of fuel in a blast furnace being the production of heat and the reduction of the ores, all successful practice depends on the use of heat in the most scientific and efficient manner. It should be treated as a measurable quantity, mathematically similar to any other measurable quantity, for although not a substance, heat is one of the most important forms of energy.

Of this energy, modern furnace practice attempts to make use of the maximum amount available for producing useful work. Energy itself is, of course, indestructible, but the available part is liable to diminution by the action of certain natural processes, such as conduction, radiation, friction, etc. The processes by which energy is rendered unavailable as a source of work, are classed together under the name of dissipation of energy, and it is through a better understanding of the laws governing this, that further improvement and savings in our furnace practice can be obtained.

Third installment of a paper read at the New York meeting of the American Iron and Steel Institute, May 28. The author, A. E. Maccoun, is superintendent, Edgar Thomson furnaces, Carnegie Steel Co.

Laws of Heat

The heat of combustion of a substance is the quantity of heat given off when a given weight of the substance combines with oxygen, and it is the same whether the union takes place slowly or rapidly. The heat involved in any given chemical reaction is always the same. Chemical action is always accompanied by an evolution or absorption of heat. Similarly it is true that in order to overcome the force which holds these elements together the same quantity of heat must be supplied from some external source, and this is called the heat of decomposition. Any substance which has the power to unite with others can do chemical work, and it possesses chemical energy.

In a test on Isabella furnace No. 3, of the Carnegie Steel Co., made from Aug. 5 to 13, 1909, the principal aim was to determine the quantity and heat value, by measurement, of the blast furnace gases corresponding to the coke consumption of this furnace

Table I.

DAILY STOCK SHEET.

	Aug. 5-6.	Aug. 6-7.	Aug. 7-8.	Aug. 8-9.	Aug. 9-10.	Aug. 10-11.	Aug. 11-12.	Aug. 12-13.	Totals for 8 days of test.
Pounds of ore used, 24 hours:									
Mesabi	1,051,200	1,081,200	1,184,000	1,086,400	1,093,200	1,154,400	1,139,600	1,139,600	8,929,600
Old Range	657,000	666,000	720,000	666,000	666,000	702,000	693,000	693,000	5,463,000
Total	1,708,200	1,747,200	1,904,000	1,752,400	1,759,200	1,856,400	1,832,600	1,832,600	14,392,600
Pounds of scrap used, 24 hours:									
Ladle	14,700	14,700	16,100	11,900	None.	1,800	18,200	14,700	.....
Pig machine	28,700	28,000	32,900	35,000	43,400	39,700	30,800	33,600	.....
Runner	7,700	9,100	7,000	4,900	8,400	8,900	4,900	5,600	.....
Total	51,100	51,800	56,000	51,800	51,800	50,400	53,900	53,900	420,700
Pounds stone used, 24 hours	578,160	586,080	633,600	589,600	597,920	630,240	622,160	622,160	4,859,920
Pounds coke used, 24 hours	752,000	762,300	824,000	762,300	762,300	803,500	793,500	793,500	6,253,400
Tons of iron produced, 24 hours	410.0800	369.0840	446.0960	384.1240	404.0140	407.0220	419.1340	404.1040	3,245.0000
Pounds of coke per ton of iron	1,835	2,067	1,849	1,980	1,886	1,975	1,889	1,964	1,927
Tons of fuel dust produced per 24 hr.	42.1720	None.	50.0060	50.2100	54.0540	26.0860	19.2140	48.1580	656.900

Table II.

BURDEN—BASED ON TOTAL MATERIALS CHARGED.
(From Aug. 5 to 13, 1909.)

		Silica,		Alumina,		CaO and MgO,		Iron,		Phosphorus.		Manganese,	
Total Materials,	pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.
Mesabi	8,929,600	5.73	511,666	3.61	322,359	.47	41,969	48.48	4,329,070	.070	6,250.72	.76	67,864.96
Old Range	5,463,000	11.12	607,486	2.48	135,482	1.17	63,917	51.52	2,814,538	.052	2,840.76	.18	9,833.40
Total	14,392,600		1,119,152										
Coke	6,253,400	6.98	436,487	3.88	242,633	.19	11,881	1.09	68,162	.013	812.94	.03	1,876.02
Limestone	4,859,920	6.63	322,213	2.72	132,190	49.58	2,409,548	.21	10,206	.013	632.79	...	.....
Total			1,877,852		832,664		2,527,315	.....	7,221,976	....	10,536.21	...	79,574.38
Deduct downcomer	656,900	7.92	52,026	4.10	26,933	1.78	11,692	51.23	336,530	.083	545.23	.46	3,021.74
Net total			1,825,826		805,731		2,515,623	93.2	6,885,446	....	9,990.98	...	76,552.64
Less 1 per cent Si. in metal			158,099					100.0	7,387,817 3,298 tons	....	.....	1/6 loss	12,758.77
Totals		32.36	1,667,727	15.63	805,731	48.81	2,515,623	.....	.....	.135	9,990.98	.86	63,793.87

Total cinder volume, 5,154,009 pounds; pounds cinder per ton of metal, 1,561 pounds.

Analyses of slag show the $FeO + MnO_2 + S = 3.2$ per cent, so the SiO_2 and CaO and MgO is taken as furnishing 96.8 per cent of the total slag produced. Analyses of iron show total carbon + Mn + P + S + Si = 6.8 per cent, so the total Fe in burden is taken as 93.2 per cent of total iron produced. Taking into account losses of flue dust in stoves, boilers and stacks, which could not be weighed, together with Fe going into slag, the calculated product checks very closely with the actual.

Table III.

AVERAGES OF HOURLY GAS ANALYSES, BY VOLUME.
(Dry gas at 62 degrees Fahr. and 30-inch Hg.)

Date.	CO_2	CO	H_2	CH_2	N_2	Total.	Calculated.	B. T. U. Calorimeter, wet gas.	B. T. U. Calorimeter, dry gas.	Moisture grains per cu. ft. dry gas as metered, daily average.
Aug. 5	15.59	23.35	1.70	.086	59.05	99.776	82.86	.....	.....	25.75
Aug. 6	16.30	22.06	1.31	.046	60.24	99.956	76.09	.....	.....	19.58
Aug. 7	15.87	22.92	1.88	.063	59.25	99.983	81.09	74.63	76.04	15.08
Aug. 8	16.59	22.97	2.18	.040	58.17	99.910	81.86	76.96	78.41	22.23
Aug. 9	16.52	22.31	2.15	.013	59.00	99.993	79.33	75.50	76.92	21.63
Aug. 10	16.65	22.62	2.16	.023	58.55	100.003	80.56	75.80	77.23	17.58
Aug. 11	16.45	22.71	1.98	.017	58.50	100.007	79.99	76.00	77.43	18.26
Aug. 12	16.57	22.78	2.53	.004	58.10	100.004	82.23	76.24	77.68	19.65
Average	16.32	22.715	1.99	.0365	58.86	99.9215	80.55	75.84	77.27	19.97
Adjusted	16.33	22.73	1.99	.04	58.91	100.000	.....	.....	.....	20.05*

*Average of all readings during test.

and compare the results obtained with a theoretical heat balance sheet as usually calculated.

The results were fairly satisfactory, and were as accurate as could be obtained under the circumstances. The furnace, under other conditions, might have been on lower coke consumption, but the test was made during the hottest weather of the summer, and it also will be observed from the burden that the cinder volume was rather high, due to the ores used. In Fig. 4 is shown the furnace lines and the various positions at which testing apparatus was attached.

For the first few days of the test some difficulty was experienced in getting correct calorimeter results. These were taken as nearly continuously as possible. The samples of gas for analysis and for the calorimeter were taken from the same outlet. The difficulty, at first, was due to being unable to burn this low fuel value gas in a satisfactory manner, but finally, by improving the burner, and adding a larger gasometer, very consistent results were obtained. However, they were uniformly lower than the heat value calculated from gas analyses. Some of the reasons for this difference will be considered later.

For simplicity, the test is discussed in the following sections: Burden and products; chemical results; gas, air and power measurements; theoretical heat balance; general summary and comparisons.

The following table shows the burden and products:

	Pounds.
Total ore charged	14,392,600
Total coke charged	6,253,400
Total coke dust left in cars	25,900
Total coke charged to furnace	6,279,300
Total stone used	4,859,920
Total flue dust produced	656,900
Total scrap used	420,700
Total scrap produced	317,500
Scrap difference	103,200
Total product, tons	3,245

The scrap used is in excess of the scrap produced, but the difference is so small that the actual product will be taken as 3,245 tons. No flue dust was used.

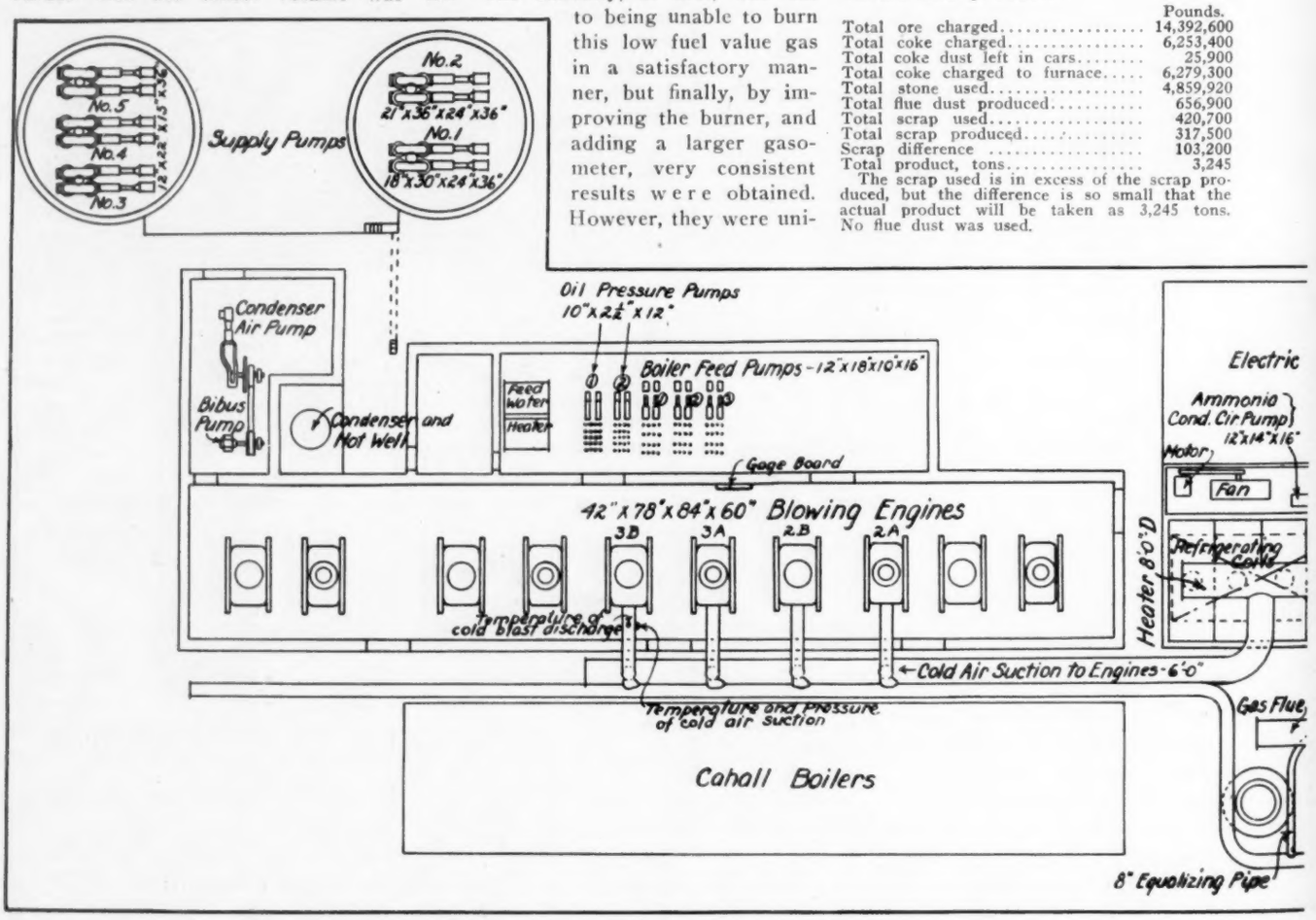


FIG. 4—OUTLINE OF CONNECTIONS USED IN HEAT VALUE

Table IV.

INITIAL H. P. AND BOILER H. P. REQUIRED

Engines, Pumps, Etc.	I. H. P.	Total H. P. hrs. during test.	Total Kw. hrs. during test.	H. P. to furnace No. 3.	Total H. P. hrs. to furnace No. 3.	Steam per hr. per I. H. P. lbs.	Equiv. total boiler H. P. hrs. to fce. No. 3.	No. and dimensions of units. (All pumps duplex except)	
Blowing engines	1,758.64	337,658.9	.....	1,758.64	337,658.9	20	205,264	2 Todd Independent Comp. Cond. and 1 high press. cond.	42x78x84x60 in.
NH_3 compressors	499.15	95,836.8	.....	499.15	95,836.8	21	61,172	2 York Mfg. Co. Cross Comp. Cond.	28.5x54x22.5x36 in.
Supply pump No. 1	84.32	16,189.4						1 W. & Snyder Comp. Non-Cond.	18x30x24x36 in.
Supply pump No. 2	112.32	21,565.4						1 E. & Carpenter Comp. Non-Cond.	21x36x24x36 in.
Supply pump No. 3	3.86	741.1	.....	104.27	20,020.3	80	48,680	3 W. & Snyder Comp. Non-Cond.	12x22x15x36 in.
Supply pump No. 4	47.94	9,204.5							
Supply pump No. 5	49.48	9,500.2							
Boiler feed pump No. 1	16.01	3,703.9							
Boiler feed pump No. 2	8.17	1,568.6	.....	13.06	2,717.5	80	6,608	3 E. & Carpenter Comp. Non-Cond.	12x18x10x16 in.
Boiler feed pump No. 3	15.00	2,880.0							
Brine pump	14.11	2,709.1	.....	14.11	2,709.1	100	8,234	1 E. & Carpenter Simple Non-Cond.	12x14x16 in.
NH_3 condens'g circ. pump	14.17	2,720.6	.....	14.17	2,720.6	100	8,239	1 E. & Carpenter Simple Non-Cond.	12x14x16 in.
Comp. room conden. pump	7.67	1,472.6	.....	7.67	1,472.6	100	4,476	1 E. & Carpenter Simple Non-Cond.	16x24x24 in.
Blow'g room cond. eng.	57.26	10,993.9	.....	19.08	3,664.6	33	3,664	1 Weiss Condenser Simple Eng.	16x22x24 in.
C'nder cast'g mch. eng.	50.00	2,000.0	.....	50.00	2,000.0	35	2,128		
Charg'g furn.-skips, larry	.....	.....	763.3	.....	1,206.0	23	843		
Fan motor	.....	.....	5,455.0	.....	8,618.9	23	6,025		
Pig machine motor	.....	.....	1,238.8	.....	1,957.3	23	1,368		
					480,582.6 = 2,503 I. H. P.		356,701 = 1,858 boiler H. P. net		

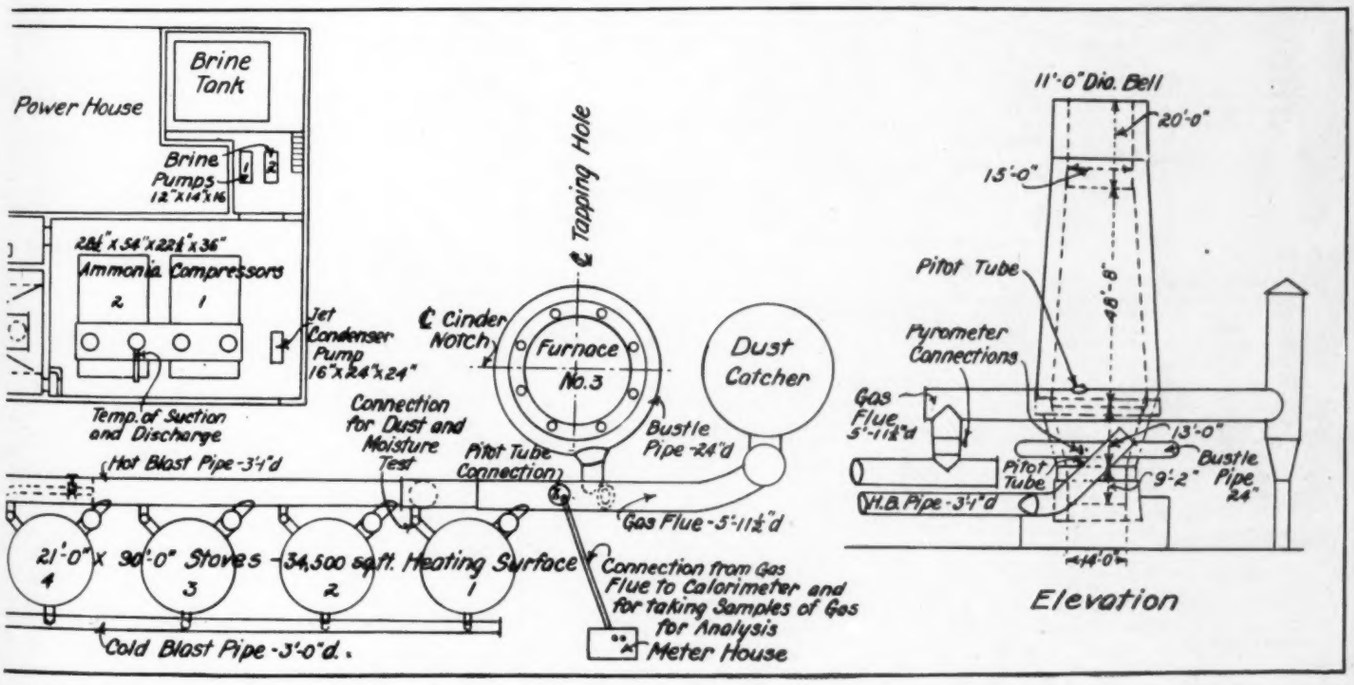
One Boiler H. P. Hour = 32.9 lbs. water.
Water rating of blowing engines and compressors taken from indicator cards; other ratings assumed.
Distribution of power:—35 per cent of supply pumps.
33⅓ per cent of boiler feed pumps.
33⅓ per cent of blowing engine room condenser engine.

The pounds of material used per ton of metal produced were as follows:

	Pounds.
Ores	4,435.3
Net coke, less coke dust	1,927.1
Stone	1,497.6
Flue dust produced per ton of metal.	202.4
Flue dust used per ton of metal	None

The daily stock sheet is shown in Table I. The burden, based on the total materials charged, is shown in Table II.

On account of the cinder from the furnaces being handled by a cinder machine, it was watered and loaded into cars wet. Consequently, it was necessary to obtain samples that would furnish a good basis for the calculation of moisture, due to the difference in the quality of cinder and the length



TEST ON ISABELLA FURNACE NO. 3 OF THE CARNEGIE STEEL CO.

Table V.

ANALYSIS OF IRON PRODUCED.

For 24 hours ending at 9:00 a. m. on	Per cent Iron.	Per cent Silicon.	Per cent Sulphur.	Per cent Phos.	Per cent Mang.	Per cent Total Carbon.
Aug. 6, 1909.....	93.15	1.14	.034	.160	.82	4.70
Aug. 7, 1909.....	93.20	1.00	.032	.162	.86	4.75
Aug. 8, 1909.....	93.58	1.00	.037	.152	.70	4.53
Aug. 9, 1909.....	93.61	1.10	.044	.148	.70	4.40
Aug. 10, 1909.....	92.91	1.32	.028	.150	.92	4.67
Aug. 11, 1909.....	93.00	.83	.025	.152	1.10	4.89
Aug. 12, 1909.....	92.88	1.00	.023	.156	1.00	4.94
Aug. 13, 1909.....	93.27	.82	.028	.150	.98	4.75
Average.....	93.20	1.03	.031	.154	.89	4.70
Adjusted.....	93.20	1.03	.030	.150	.89	4.70

Table VI.

SUMMARY OF CHEMICAL RESULTS OF TEST.

Average Iron Analysis.

Iron	93.20 per cent	Phosphorus	0.150 per cent
Silicon	1.03 per cent	Manganese	0.89 per cent
Sulphur	0.030 per cent	Total carbon.....	4.70 per cent

Average Ore Analysis.

	Mesabi, per cent.	Old Range, per cent.		Mesabi, per cent.	Old Range, per cent.
Silica	5.73	11.12	Phos	0.070	0.052
Fe_2O_3	69.26	73.60	Moisture	14.39	8.76
Fe	48.48	51.52	Al_2O_3	3.61	2.48
MnO_2	1.21	0.28	CaO	0.25	0.78
Mn	0.76	0.18	MgO	0.22	0.39
P_2O_5	0.16	0.12	Ign. loss	5.17	2.47

Average Coke Analysis.

Silica	6.98 per cent	Mn	0.03 per cent
Al_2O_3	3.88 per cent	P_2O_5	0.03 per cent
CaO	0.12 per cent	Phos	0.013 per cent
MgO	0.07 per cent	Fixed carbon	83.27 per cent
FeS	1.72 per cent	Volatile matter...	1.02 per cent
MnO_2	0.05 per cent	Moisture	2.86 per cent

Average Limestone Analysis.

Silica	6.63 per cent	CaO	47.53 per cent
Al_2O_3	2.72 per cent	MgO	2.05 per cent
Fe_2O_3	0.30 per cent	Moisture	1.00 per cent
P_2O_5	0.030 per cent	CO_2	39.53 per cent
Phos	0.013 per cent	FeS	0.21 per cent

Average Downcomer Analysis.

Silica	7.92 per cent	Phos	0.083 per cent
Al_2O_3	4.10 per cent	Fe_2O_3	73.18 per cent
CaO	1.45 per cent	Fe	51.23 per cent
MgO	0.33 per cent	Fixed carbon	10.51 per cent
MnO_2	0.72 per cent	CO_2	0.90 per cent
Mn	0.46 per cent	Moisture	0.70 per cent
P_2O_5	0.19 per cent		

Average Slag Analysis.

Silica	33.74 per cent	Sul	1.07 per cent
CaO	43.24 per cent	Al_2O_3	14.64 per cent
MgO	3.82 per cent	FeO	1.42 per cent
CaS	2.41 per cent	MnO_2	0.73 per cent

Table VII.

AVERAGE ANALYSES

Iron.	Per cent.	Cinder.	Per cent.	Downcomer Produced.	Per cent.
Iron	93.20	SiO_2	33.74	Silica	7.92
Silicon	1.03	CaO	43.24	Al_2O_3	4.10
Sulphur	.03	MgO	3.82	CaO	1.45
Phosphorus	.15	CaS	2.41	MgO	.33
Manganese	.89	Al_2O_3	14.64	MnO_2	.72
Total carbon	4.70	FeO	1.42	P_2O_5	.19
Total	100.00	Mno	.73	Fe_2O_3	73.18
		Total	100.00	Fixed carbon	10.51
				Co_2	.90
				Moisture	.70
				Total	100.00

Correction for Net Coke Used.

	Pounds.
Downcomer produced per ton of iron, pounds.....	202.4
Total weight of fixed carbon in downcomer; 202.4 × 10.51 per cent.....	21.272
Total weight of coke in downcomer; 21.272 ÷ 83.26 per cent (fixed carbon in coke)	25.55
Net coke used in furnace per ton of iron; 1,927.1 — 25.55.....	1,901.55
Figure used	1,901.6

Correction for Net Stone Used.

Downcomer produced per ton of iron.....	202.4
Total weight of CO_2 in downcomer produced; 202.4 × 0.9.....	1.82
Total weight of limestone in downcomer; 1.82 ÷ 39.53 per cent (CO_2 in stone)	4.60
Net stone charged in furnace per ton of iron; 1,497.6 — 4.6.....	1,493

Correction for Net Ore Used.

Weight of ore charged per ton of metal.....		4,435.3
Weight of stone in downcomer.....	4.6	
Weight of coke in downcomer.....	25.55	
	30.15	
Weight of ore in downcomer (202.4 — 30.15).....		172.25
Net ore used per ton of iron.....		4,263.05
Figure used		4,263.00

of time cars stood before being weighed. However, in sampling, the wettest portions obtained by digging down in the tops of the cars were taken, and they are probably nearly representative. An average of these daily samples showed 13.57 per cent moisture. The car weights on cinder show that 5,895,200 pounds were produced; subtracting 13.5 per cent moisture, or 795,852 pounds, leaves 5,099,348 pounds. This checks very closely with the 5,154,009 pounds given in the burden.

Chemical Results

The different grades of ore, stone and coke were sampled four times in each 24 hours and complete analysis was made each day of a combined sample. The analyses were averaged at completion of the test. The iron produced and the cinders were sampled on each cast or flush of the furnace and analyzed. The results of gas analyses will be considered later.

Table VIII.

DRY BLAST DELIVERED BY ENGINES

Press. entering engines	= 1.29 in. H_2O
Temp. entering engines	= 51.6 deg. Fahr.
Total revolutions.....	= 979,691
Diam. blowing cyl....	= 84 in.
Diam. piston rod.....	= 7.5 in.
Stroke of engines.....	= 60 in.
Cu. ft. piston disp. per revolution	= 381.7
Total gross wind deliv.	= 373,948,055 cu. ft.
Cor. to 62 deg. Fahr. and 30 in. hg. press..	= 375,647,275 cu. ft. (wet)
Aver. corrected blast..	= 32,608 cu. ft. (wet) per min. of total running time

The average downcomer analysis was taken from average samples collected daily during the test. The scrap analysis was estimated. The analysis of iron produced and the averages of hourly gas analyses are given in Tables V and III.

Results of Calorimeter Tests

Analyses were made hourly and but few results were lost through any accident to the apparatus. The calorimeter results were not entirely satisfactory. The results on the first two days were discarded entirely as the gas would not burn properly in the ordinary burner owing to its leanness and to slight pulsations in the main. Later the gas was kept burning by devising an inverted burner which permitted a slight preheating and kept the jet burning toward the flow of gas. The pulsations were taken care of by placing a relatively large gasometer in the line. Moisture results were not secured regularly during the first part of the test, owing to all

the attention being given to the calorimeter.

Relative to the calorimeter results, the technical branch of the United States geological survey at Pittsburgh states that with a lean gas of about 80 B. T. U. it also had been unable to get satisfactory results and depended on the B. T. U. results calculated from the analyses in such cases. The methods of gas analysis were the accepted methods in general use, as follows: Carbon dioxide, absorption by caustic potash; oxygen, absorption by pyrogallic acid; carbon monoxide, absorption by ammoniacal cuprous chloride; hydrogen and methane, the residue was enriched with hydrogen and exploded.

While a more expeditious method is available, that adopted is more widely used and as previous analyses of gas from dry blast furnaces have had the carbon monoxide determined by cuprous chloride, it was thought best to adhere to the same method. The chemical results of the test are given in Table VI.

The gas, air and power measurements are shown in Tables VIII, XVI, XI, IV and XII.

The theoretical heat balance was determined as shown in Tables IX, VII, XV, XIII, XIV and X.

Summary of Test

As previously explained, the object of this test on a dry-blast furnace, was to arrive at the quantity and heat value of the flue gases passing off from such a furnace under these con-

Table IX.

BALANCE SHEET OF BASIC BURDEN, AUG. 5 TO 13, 1909.

Average Burden.

	Pounds.
Mesabi ore	14,800
Old Range	9,000
Scrap	700
Coke	10,200
Stone	8,080

Total Ores Used.

	Per cent.	Pounds.
Mesabi	62.04	8,929,600
Old Range	37.96	5,463,000
Total	100.00	14,392,600

Materials Used per Ton of Metal Produced.

	Pounds.
Ore	4,435.3
Coke	1,927.1
Stone	1,497.6
Downcomer produced per ton of iron, pounds	202.4
Cinder produced per ton of iron, pounds	1,571.45
Temperature of blast, deg. Fahr.	833
Temperature of waste gases, deg. Fahr.	324
Average composition of waste gases, CO_2, per cent	16.33
Average composition of waste gases, CO, per cent	22.73
Product per day, tons (2,240 pounds)	405.62
Total product, tons	3,245

Table X.

HEAT BALANCE SHEET.

In the heat balance sheet below, it is understood that all heats referred to are calculated from the base temperature of 62 degrees Fahr. The potential heat in furnace gases as yet undeveloped, on leaving furnace, is obtained from the potential heat in the volatile matter in the coke charged,

	B. T. U.
19.40 × 23,616 B. T. U. =	458,150
The heat which may still be obtained by burning the CO in the gas to CO_2 = 951.43 pounds × 10,205 B. T. U. =	9,709,343
Total	10,167,493

Sensible heat entering from external sources.

	B. T. U.	Per cent of heat exclusive of potential heat in furnace gases.	Per cent of total heat involved.
Coke, wet	7,467	0.06	0.03
Stone, wet	5,888	0.04	0.03
Ore, wet	24,413	0.18	0.10
Blast, dry 1,386,812 {		10.18	5.83
Blast moisture from same 6,897 {	1,393,709	0.05	0.03
Total	1,431,477	10.51	6.02
Heat developed in furnace.			
C to CO, 951.43 × 4,375 B. T. U.	4,162,506	30.58	17.50
C to CO_2, 526.75 × 14,580 B. T. U.	7,680,015	56.41	32.30
Heat of pig formation	133,600	0.98	0.56
Heat of slag formation	206,348	1.52	0.87
Total	12,182,469	89.49	51.23
Total heat entering and developed in the furnace.	13,613,946	100.00	57.25
Undeveloped heat remaining from fuel	10,167,493		42.75
Grand total	23,781,439		100.00
Sensible heat in outgoing materials.			
Heat in iron	1,283,520	9.42	5.39
Heat in slag	1,485,020	10.90	6.25
Heat in flue dust	10,228	0.08	0.04
Heat in top gas, dry	654,029	4.80	2.75
Moisture, sensible heat, in top gas	92,565	0.68	0.39
Moisture, latent heat, in top gas	812,021	5.96	3.41
Total	4,337,383	31.84	18.23
Heat Utilized in furnace reactions.			
Reduction of Fe_2O_3, (Fe) 2,086.631 × 3,143	6,558,281	48.17	27.58
Reduction of SiO_2, (Si) 23.072 × 11,571	266,966	1.96	1.12
Reduction of P_2O_5, (P) 3.233 × 10,605	34,286	0.25	0.15
Reduction of MnO_2 to Mn, (Mn) 19.936 × 4,100	81,738	0.60	0.34
Reduction of MnO_2 to MnO, (MnO) 3.84 × 871	3,345	0.02	0.01
Reduction of FeS to Fe, (Fe) 1.176 × 772	908	0.01	0.00
Expulsion of CO_2 in flux, ($CaCO_3$) 1,266.86 × 812	1,028,690	7.56	4.33
Expulsion of CO_2 in flux, ($MgCO_3$) 62.54 × 628	39,275	0.29	0.17
Expulsion of volatile matter in fuel, 19.40 × 10.92.	21,185	0.16	0.09
Decomposition of moisture in blast, 20.84 × 5,806.	120,997	0.89	0.51
Total	8,155,671	59.91	34.30
Loss by radiation, expansion of blast, cooling water and unaccounted for	1,120,892	8.25	4.72
Total heat utilized in and leaving furnace	13,613,946	100.00	.....
Undeveloped heat remaining in gases	10,167,493		42.75
Grand total	23,781,439		100.0

Table XI.

ACTUAL GAS LEAVING FURNACE AS MEASURED BY PITOT TUBE IN GAS MAIN

Gas pressure	=	0.208 inches H_2O
Gas temperature	=	324 degrees Fahr.
Average reading of pitot tubes	=	0.208 inches H_2O
Diameter of main = 71.5 inches	=	27.88 square feet area
Density of gas	=	0.051320, wet
Density of gas	=	0.052532, dry
Specific gravity	=	1.017, wet
Specific gravity	=	1.041, dry
Gas per hour	=	3,695,048 cu. ft., wet
Total for 8 days (less 93 minutes)	=	703,721,892 cu. ft., wet
Total for 8 days (less 93 minutes)	=	663,661,116 cu. ft., dry
Corrected to 62 degrees Fahr. and 30 inches Hg. pressure	=	439,173,098 Standard gas, dry
Metal produced	=	3,245 tons
Corrected gas per ton iron	=	135,338 cu. ft. Standard gas, dry*

*This probably would be reduced slightly by the dirt that had collected in the gas flue, which amounts could not be obtained.

Table XII.

AVERAGES OF DATA

			Aug. 5.	Aug. 6.	Aug. 7.	Aug. 8.	Aug. 9.	Aug. 10.	Aug. 11.	Aug. 12.	Average for 192 hrs.	Total for 192 hrs.
	PRESSURES:—											
(1).	Barometer	Ins. Hg. ..	29.312	29.452	29.537	29.470	29.400	29.500	29.480	29.360	29.400	.....
(2).	Air in refrigerating rooms	Ins. H_2O..	2.110	2.500	2.420	2.630	2.500	2.510	2.458	2.620	2.470	.....
(3).	Air entering blowing engines	Ins. H_2O..	1.313	1.231	1.850	0.990	1.167	1.250	1.246	1.784	1.290	.....
(4).	Air leaving blowing engines	Lbs. sq. in.	15.490	13.390	14.820	15.910	14.990	15.910	15.720	15.230	15.040	.....
(5).	Air at blast furnace tuyeres	Lbs. sq. in.	15.110	13.310	15.090	16.400	15.300	15.340	15.230	15.570	15.120	.....
(6).	Difference of pressure by Pitot tubes (hot blast)	Ins. H_2O..	1.234	1.310	1.257	1.182	1.201	1.283	1.297	1.248	1.252	.....
(7).	Difference of pressure by Pitot tubes (gas main)	Ins. H_2O..	0.220	0.185	0.187	0.026	0.212	0.203	0.227	0.225	0.208	.....
(8).	Gas in main	Ins. H_2O..	3.79	4.26	4.72	5.07	6.55	5.80	5.95	6.25	5.32	.....
(9).	Steam in blowing room	Lbs. sq. in.	115.2	115.6	115.6	116.8	116.9	116.4	115.7	116.4	116.1	.....
(10).	Steam in NH_3 compressor room	Lbs. sq. in	114.9	117.6	116.7	117.1	116.5	117.3	116.9	117.5	116.8	.....
(11).	Vacuum in blowing rooms	Ins. Hg...	25.54	25.58	26.01	26.07	26.04	26.11	26.00	25.67	25.88	.....
(12).	Vacuum in NH_3 compressor room	Ins. Hg...	19.96	20.49	19.84	20.06	19.73	20.67	20.73	20.13	20.20	.....
(13).	Water at main supply pumps—suction	Ins. Hg...	.....	.....	6.50	6.56	6.38	6.25	6.42	6.12	6.15	.....
(14).	Water at main supply pumps—outlet	Lbs. sq. in.	65.5	65.3	65.3	65.5	65.7	66.0	66.1	65.4	65.7	.....
(15).	Water at boiler feed pumps—outlet	Lbs. sq. in.	148.3	147.2	147.6	147.6	147.8	149.2	149.2	149.4	148.3	.....
(16).	Water at NH_3 condensor circulating pumps—inlet	Lbs. sq. in.				Measured from drawing.					2.2	.....
(17).	Water at NH_3 condensor circulating pumps—outlet	Lbs. sq. in.				Measured from drawing.					28.3	.....
(18).	Oil in lines to furnace bells	Lbs. sq. in.	941.0	946.9	947.5	941.3	942.0	940.8	944.6	938.8	941.6	.....
(19).	Brine circulating pumps—inlet	Lbs. sq. in.				Measured from drawing.					2.0	.....
(20).	Brine circulating pumps—outlet	Lbs. sq. in.	31.3	30.6	31.4	31.2	31.3	31.3	31.4	31.4	31.2	.....
(21).	NH_3 compressors—head	Lbs. sq. in.	195.3	193.1	195.4	195.5	196.5	186.5	185.7	189.1	192.1	.....
(22).	NH_3 compressors—back	Lbs. sq. in.	14.3	14.5	15.5	15.5	16.5	13.5	13.2	14.5	14.7	.....
	TEMPERATURES:—											
(23).	Air entering refrigerating room	Deg. Fahr..	78.0	81.3	82.1	84.0	85.8	77.5	77.5	75.4	80.2	.....
(24).	Air leaving refrigerating room	Deg. Fahr..	34.7	38.0	37.9	36.9	37.8	34.0	32.9	36.4	36.1	.....
(25).	Air entering blowing engine	Deg. Fahr..	49.4	52.0	52.8	55.4	54.2	48.4	49.3	49.4	51.6	.....
(26).	Air leaving blowing engine	Deg. Fahr..	169.3	158.3	164.9	175.7	167.6	165.2	167.8	169.4	167.2	.....
(27).	Hot blast entering tuyeres	Deg. Fahr..	857.0	706.2	857.9	985.2	812.5	794.2	800.4	853.2	833.4	.....
(28).	Gas leaving blast furnace	Deg. Fahr..	.....	.....	416.9	357.9	300.2	276.0	304.0	312.8	324.0	.....
(29).	Gas at B. & W. boilers (No. 3 furnace)	Deg. Fahr..	327.7	298.2	333.3	314.9	271.7	263.4	277.3	288.7	291.8	.....
(31).	Water in supply mains	Deg. Fahr..	76.3	75.9	77.2	77.1	76.9	75.7	76.3	75.5	76.4	.....
(32).	Water leaving blast furnace	Deg. Fahr..	79.0	81.6	82.4	83.4	82.0	81.3	81.4	81.2	81.5	.....
(33).	Water in hot well at blowing room	Deg. Fahr..	129.6	126.5	125.8	128.8	128.3	129.6	133.9	129.3	129.4	.....
(34).	Water leaving condenser pump in compressor room	Deg. Fahr..	134.4	133.9	132.5	132.7	135.2	128.3	127.2	129.5	131.3	.....
(35).	Water leaving feed water heater	Deg. Fahr..	179.3	175.4	174.0	174.7	181.3	180.8	178.8	180.5	177.6	.....
(36).	Water on NH_3 condenser coils	Deg. Fahr..	76.3	75.9	77.25	77.13	76.9	75.7	76.3	75.5	76.3	.....
(37).	Water leaving NH_3 condenser coils	Deg. Fahr..	85.9	85.6	86.75	87.04	88.3	84.4	84.2	85.1	85.9	.....
(38).	Brine in feed lines	Deg. Fahr..	12.4	13.1	13.9	14.08	16.3	11.0	12.9	12.2	13.2	.....
(39).	Brine in return lines	Deg. Fahr..	22.3	23.3	23.9	24.20	26.7	19.9	21.0	21.2	22.8	.....
(40).	NH_3 entering compressors	Deg. Fahr..	....	....	.....	.....	.....	20.83	28.0	25.2	24.5	.....
(41).	NH_3 leaving compressors	Deg. Fahr..	....	....	.....	.....	.....	278.3	280.9	270.0	276.1	.....
	REVOLUTIONS OF ENGINES AND COMPRESSORS:—				*					†		
(42).	Total revolutions of blowing engines for 24 hours	Rev.	117,346	123,299	123,465	117,842	122,917	123,033	123,808	127,981	.....	979,691
(43).	Average revolutions per minute	R. P. M...	84.3	85.6	85.7	81.9	85.4	85.4	85.9	83.3	84.96	.....
(44).	Total revolutions per minute of NH_3 compressors (2)	R. P. M...	100.0	100.0	100.0	100.0	100.0	97.0	90.0	100.0	97.8	.....
(45).	Revolutions per minute of blowing engine, room cond. engine	R. P. M...	77.4	78.8	78.4	78.2	77.8	74.1	77.8	78.4	.....	.....
	DOUBLE STROKES OF PUMPS PER MINUTE:—				*					†		
(46).	Total double strokes of brine pumps for 24 hours	D. S.	30,043	31,411	31,756	31,609	31,670	31,558	31,332	32,986	.....	252,365
(47).	Average double stroke of brine pumps per minute	D. S.	21.8	21.8	22.0	21.9	21.9	21.9	21.7	21.9	21.9	.....
(48).	Total double strokes NH_3 condenser circulating pump	D. S.	*362.0	489.0	490.0	506.0	489.5	510.0	496.5	†532.0	20.6	237,450
(49).	Total double stroke boiler feed No. 1 and No. 2 pumps	D. S.	*584.5	593.5	570.0	605.5	570.5	567.5	577.0	†587.5	24.1	277,947
(50).	Total double stroke condenser pump compressor room	D. S.	*879.0	894.0	879.0	862.0	866.0	871.0	899.0	†909.0	36.6	241,344
(51).	Total double stroke supply pump No. 1	D. S.	*107.0	122.0	93.5	108.5	114.0	114.0	115.0	†112.5	9.2	105,281
(52).	Total double stroke supply pump No. 2	D. S.	*166.0	162.0	133.5	158.0	161.0	144.5	130.5	†164.5	12.6	144,887
(53).	Total double stroke supply pump No. 3, 4 and 5	D. S.	*364.0	386.5	447.0	392.0	386.5	404.5	413.5	†415.5	33.1	381,172
(60).	Moisture in atmosphere per cubic foot	Grains	6.173	6.918	5.838	7.000	6.774	4.337	4.262	6.010	5.789	.....
(61).	Moisture in dry blast per cubic foot	Grains	1.522	1.558	1.555	1.558	1.738	1.488	1.495	1.558	1.560	.....
(54).	Average length of pump strokes (supply)	Inches	.....	.....	.....	.....	.....	.....	.....	.....	34.2	.....
(55).	Average length of pump strokes (brine)	Inches	.....	.....	.....	.....	.....	.....	.....	.....	14.7	.....
(56).	Average length of pump strokes (NH_3 cond. circ. pump)	Inches	.....	.....	.....	.....	.....	.....	.....	.....	13.2	.....
(57).	Average length of pump strokes (compressor room)	Inches	.....	.....	.....	.....	.....	.....	.....	.....	20.0	.....
(58).	Average length of pump strokes (boilers)	Inches	.....	.....	.....	.....	.....	.....	.....	.....	13.3	.....
(59).	Average length of pump strokes (oil pressure)	Inches	.....	.....	.....	.....	.....	.....	.....	.....	11.6	.....

Brine pump and blowing engine revolutions taken with counters.
*For 23 hours and 1,000 revolutions added for time counter was out of commission on engine 2-A, Aug. 5.
†For 25 hours.

Table XIII.

BALANCE SHEET OF BASIC BURDEN AND BLAST

August 5 to 13, 1909. (Per 2,240 pounds Iron Produced).

Charges.				Pig.		Slag.		Gases.	
H_2O	16.40	H_2O	699.13			SiO_2	282.588	H_2O	699.13
SiO_2	7.78	SiO_2	331.66	Si	23.072			O	26.00
Al_2O_3	3.18	Al_2O_3	135.56			Al_2O_3	135.560		
CaO	.45	CaO	19.18			CaO	19.180		
MgO	.28	MgO	11.94			MgO	11.940		
Fe_2O_3	70.91	Fe_2O_3	3,022.89	Fe	2,083.495	Scrap	32.525	O	906.870
P_2O_5	.15	P_2O_5	6.40	P	2.793			O	3.607
MnO_2	.85	MnO_2	36.24	Mn	19.936	MnO	3.840	O	12.464
	100.00								
Ore, pounds....	4,263								
SiO_2	6.63	SiO_2	98.98			SiO_2	98.98		
Al_2O_3	2.72	Al_2O_3	40.61			Al_2O_3	40.61		
P_2O_5	.03	P_2O_5	.45	P	.19			O	.26
CaO	47.53	CaO	709.62			CaO	709.62		
MgO	2.05	MgO	30.61			MgO	30.61		
CO_2	39.53	CO_2	590.18					CO_2	590.18
FeS	.21	FeS	3.14			Fe and S.....	3.14		
Fe_2O_3	.30	Fe_2O_3	4.48	Fe	3.136			O	1.344
H_2O	1.00	H_2O	14.93					H_2O	14.93
	100.00								
Flux, pounds ..	1,493								
SiO_2	6.98	SiO_2	132.73			SiO_2	132.73		
Al_2O_3	3.88	Al_2O_3	73.78			Al_2O_3	73.78		
CaO	.12	CaO	2.28			CaO	2.28		
MgO	.07	MgO	1.33			MgO	1.33		
P_2O_5	.03	P_2O_5	.57	P	.25			O	.32
C	83.27	C	1,583.46	C	105.28			C	1,478.18
FeS	1.72	FeS	32.71	S	.672	Fe and S.....	30.862		
H_2O	2.86	H_2O	54.39	Fe	1.176			H_2O	54.39
V. Mat.	1.02	V. Mat.	19.40					V. Mat.	19.40
MnO_2	.05	MnO_2	.95			MnO	.780	O	.17
	100.00								
Fuel, pounds...	1,901.6								
								O	1,703.67
								N	5,671.52
								H_2	2.32
		Blast	7,396.03					O	18.52
Totals:—				2,240.00		1,610.355			11,203.275

ditions and to make a comparison between this value and the pounds of coke consumed per ton of iron by the furnace; to calculate the total heat value of the coke charged into the furnace per ton of iron and to deduct from this value, the quantity of heat passing off in the flue gases. This difference, together with the heat delivered by the hot blast to furnace, gives the total heat required to do the work of reduction in the furnace.

These results also are compared with the theoretical heat balance results which have been compiled by the use of the molecular heats of formation, etc., of the various substances entering into a furnace burden.

This test purposely has been made as complete as possible. Anyone studying the entire report, could draw his own conclusions, but to save time the following brief comparison will give the gist of the results obtained.

The heat value of the fuel was as follows:

Net coke used per ton of iron = 1901.6 pounds. This contained 1478.18 pounds carbon to be gasified and 19.40 pounds of volatile matter.

1478.2 x 14580 B. T. U. (generated by burning one pound of carbon to CO_2) = 21,552,150 B. T. U. 19.40 vol. mat. x 23616 B. T. U. (per pound gen.) = 458,150 B. T. U. Maximum heat value obtainable from fuel consumed per ton of iron, by addition = 22,010,300 B. T. U.

The following results have been obtained by as many different methods as possible, so there can be no doubt of their being approximately correct. The results throughout check each other as closely as could be expected. The best instruments are liable to some percentage of error, and although analyses were taken as frequently as possible on all materials used in this furnace and on all the products produced, some slight irregularities are liable to enter into a test made on such a large scale:

Heat Value of Blast Furnace Gases per Ton of Iron.

135,338 cu. ft. (Standard) as obtained from Pitot tube in gas main x 80.55 B. T. U. per cu. ft. (Standard) gas (average analysis), = 10,901,475 B. T. U. in gas per ton of iron.

Work of Reduction, Etc.

Total B. T. U. in fuel per ton of iron:

	B. T. U.
Carbon to CO_2, 1478.2 x 14,580 B. T. U.	21,552,150
Heat from volatile matter, 1940 x 23,616 B. T. U.	458,150
Total heat available from fuel	22,010,300
Calorific value of blast furnace gas produced	10,901,475
Heat remaining from fuel, which, added to the heat of the hot blast is the total heat required for doing the work of reduction, etc., and heating up the products..	11,108,825

In comparison with this, the figures from heat balance are as follows:

	B. T. U.	B. T. U.
Heat utilized in furnace, including furnace radiation losses, etc.		13,613,946
Heat from hot blast	1,393,709	
Heat from coke	7,467	
Heat from stone	5,888	
Heat from ore	24,413	
Heat from pig formation	133,600	
Heat from slag format'ns	206,348	
	1,771,425	1,771,425
		11,842,521

Gas Analyses.

The following gas analyses were obtained from many averages:

	B. T. U. per cu. ft.
Calculated from gas analyses (at 62 deg. Fahr. and 30 inch press.) dry gas	80.55
Calculated from calorimeter analyses (at 62 deg. Fahr. and 30 inch press.) dry gas	77.27

Cubic Feet of Air Blown (62 deg. Fahr. and 30 Inch Hg.; Wet Air).

Gross cubic feet of air blown from blowing engines per minute of total running time	32,608
Net cubic feet of air blown per minute of net running time, obtained from Pitot tube in hot blast main	30,015
Net cubic feet of air blown per minute of net running time, from theoretical heat balance	27,585

Cubic Feet of Gas Produced (at 62 deg. Fahr. and 30 Inch Hg.; Dry Gas) per ton iron.

Cu. ft. of gas from Pitot tube in hot blast main	141,451
Cu. ft. of gas from Pitot tube in gas flue	135,338
Cu. ft. of gas from theoretical heat balance	132,434

To obtain the heat value passing off in the blast furnace gases we will use the results obtained from the pitot tube and gas main. There is very little difference between any of the results obtained by the three methods used. The difference between the actual measurements and the results obtained by the theoretical heat balance are easily accounted for by the fact that no scrap was used in burden for compiling theoretical heat balance. These results are as follows:

Table XIV.

DETAIL CALCULATIONS PER 1 TON (2,240 POUNDS) PIG PRODUCED, DRY BLAST

Volume of Furnace Gas (From Balance Sheet).

Carbon in gases = 1,478.18 plus (12/44 x 590.18 = 160.96) 1,639.14 lbs.

Carbon in 1 cu. ft. of gas at 62 deg. Fahr., and 30 in. Hg. Pressure, 0.012377 lbs. C.

CO = 0.07375 lbs. per cu. ft. @ 62 deg. Fahr.
CO_2 = 0.11660 lbs. per cu. ft. @ 62 deg. Fahr.
Composition of gases = 22.73 per cent CO
16.33 per cent CO_2
CO = 12/28 by weight of C.
CO_2 = 12/44 by weight of C.

Then:

CO = 0.07375 × 0.2273 × 12/28 = 0.007184 lbs. C.
CO_2 = 0.11660 × 0.1633 × 12/44 = 0.005193 lbs. C.
0.012377 lbs. C.

Gas produced at 62 deg. Fahr. and 30 in. Hg. per ton of pig:

$$\frac{1639.14}{0.012377} = \ldots\ldots\ldots\ldots\ldots\ldots \text{ 132,434 cu. ft. dry gas}$$

Oxygen in Blast (From Balance Sheet).

Oxygen in 1 cu. ft. of dry gas @ 62 deg. Fahr. 30 in. Hg. = 0.023427

CO = 0.07375 × 0.2273 × 16/28 = 0.009579 lbs. O.
CO_2 = 0.11660 × 0.1633 × 32/44 = 0.013848 lbs. O.
0.023427 lbs. O.

Total oxygen in dry gasses = 132,434 × 0.023427 lbs. = 3102.53 lbs. O.

This oxygen is derived from oxygen of blast, oxygen in moisture of blast, and oxygen from the solid charge.

Oxygen from solid charges, (dry):

From Fe_2O_3	908.214 lbs.
SiO_2	26,600 lbs.
P_2O_5	4.187 lbs.
MnO_2 MnO	12.634 lbs.
CO_2	429.220 lbs.
Total	1,380.255 lbs.

Oxygen from Blast, including moisture in same = 3,102.53 — 1,380.255 = 1,722.275 lbs.

Combustion of Carbon.

Carbon burned at tuyeres = 1,722.275 × 12/16 = 1,291.71 lbs.
Carbon burned above tuyeres = 1,478.18 — 1,291.71 = 186.47 lbs.
Percentage of oxidized carbon burned at tuyeres = 87.39 per cent

Moisture and Dry Air Present in 1 Cu. Ft. Refrigerating Room Air.

Water per cu. ft. of air (refrig. room) @ 36.1 deg. Fahr. (see Logs)	1.56 Grs.
Barometer	29.44 in. Hg.
Pressure above atmosphere in refrigerating room .....2.47 in. H_2O =	0.18 in. Hg.
Total pressure in refrigerating room = 29.44 in. plus 0.18 in.	29.62 in. Hg.
Vapor tension of 1.56 gr. H_2O per cu. ft. of vapor, corresponding to dew point of 25 deg.	0.130 in. Hg.
Absolute pressure of dry air present = 29.62 in. — 0.130 in.	29.49 in. Hg.
Dry air present = 29.49/29.62 × 1 cu. ft. refrigerating room air	0.9956 cu. ft.

Dry air @ 62 deg. Fahr. and 30 in. Hg. = 0.07626 lbs. per cu. ft.
O in air = 23.1 per cent by weight (Richards)
Reducing wgt. of dry air to 36.1 per cent Fahr. and 29.62 in. Hg.:

$$\frac{521.2}{495.3} \times \frac{29.62}{30} \times 0.07626 \text{ lbs.} = \ldots\ldots \text{ 0.079231 lbs.}$$

Oxygen present in dry air per cu. ft. of refrig. room air:
0.079231 lbs. × 0.9956 × 0.231 = ... 0.018222 lbs.
Oxygen present in moisture per cu. ft. of refrig. room air = 1.39 gr. = ... 0.000199 lbs.
Total oxygen per cu. ft. of blast @ 36 deg. Fahr. and 29.62 in. Hg. = ... 0.018421 lbs.

Total volume of refrig. air used = 1,722.275/0.018421 = 93,495 cu. ft.

Free oxygen pres. = 0.018222 × 93,495 cu. ft. = 1,703.67 lbs.

Free nitrogen present = 76.9/23.1 × 1,703.67 lbs. = 5,671.52 lbs.

H_2O present = (93,495 × 1.56 gr.)/7,000 = ... 20.84 lbs.

Total ..... 7,396.03 lbs.

Volume of Blast.

Total volume of blast at 36 deg. Fahr. and 29.62 in. Hg. = 93,495 cu. ft.

Total volume of blast @ 62 deg. Fahr. and 30 in. Hg. per ton of iron:

$$\frac{521.2}{495.3} \times \frac{29.62}{30} \times 93.495 \text{ cu. ft.} = 97.138 \text{ cu. ft. standard, wet.}$$

Total air blown at 62 deg. Fahr. and 30 in. per entire run:
3,245 × 97,138 cu. ft. (wet) = 315,212,810 cu. ft. wet.
Air at 62 deg. Fahr. and 30 in. Hg. (wet), blown per minute net operating time = 315,212,810/11,427 = 27,585 cu. ft., wet.

Carbon Burned at 62 Deg. Fahr. and 30 In. Hg.

Total volume of furnace gas at 62 deg. Fahr. and 30 in. pressure = 132,434 cu. ft., dry.
CO by analysis, 22.73 per cent = 30,102 cu. ft., dry.
1 cu. ft. CO at 30 in. and 62 deg. = 0.07375 lbs.
C in 1 cu. ft. CO at 30 in. and 62 deg. = 12/28 × 0.07375 = 0.031607 lbs.
C in total CO in furnace gas = 30.102 × 0.031607 lbs. = 951.43 lbs.
C burned to CO_2 = 1,478.18 — 951.43 = 526.75 lbs.

Heat in Blast (From 62 Deg. Fahr. to 833 Deg. Fahr.)

Sensible heat in materials contained in blast:—

Material.	Lbs.	Mean specific heat. B. T. U.	Temperature interval, deg.	B. T. U.
O_2	1,703.67	0.219708	771	288,593
N_2	5,671.52	0.251151	771	1,098,219
Heat in moisture present—sensible	.....	.....	771	.....
H_2O (Vapor)	20.84	0.429219	...	6,897
Totals	7,396.03	.....	...	1,393,709

Composition of Furnace Gas (From Balance Sheet Data.)

N present in gas per ton pig =		N =	5,671.52 lbs.
CO present in gas per ton pig — 951.43 lbs. C. burned to CO × 28/12 =		CO =	2,220.00 lbs.
CO_2 present (from Coke) in gas per ton pig — 526.75 lbs. C burned to CO_2 × 44/12 =	1,931.42 lbs.		
CO_2 pres'nt (from limestone) in gas per ton pig =	590.18 lbs.		
Total CO_2 =	2,521.60 lbs.	= CO_2 =	2,521.60 lbs.
H present from water in blast,—		H =	2.32 lbs.
Volatile matter present from coke,—		V.M. =	19.40 lbs.
Moisture present—			
From ore	699.13 lbs.		
From stone	14.93 lbs.		
From coke	54.39 lbs.		
Total moisture	768.45 lbs.	= H_2O =	768.45 lbs.
Total wght. of gas		=	11,203.29 lbs.

Furnace Gas Produced by Calculation From Preceding—Dry Gas.

	Weight, lbs.	Analysis by wgt., per cent.	Density.	Volume, cu. ft.	Analysis by volume, per cent.
CO_2 =	2,521.60	24.20 ÷	0.1166 =	207.55 =	16.64
CO =	2,220.00	21.30 ÷	0.07375 =	288.81 =	23.15
H from moist. = 2.32 lbs.					
H from V. M., — 19.4 × 4/16 = 4.85 lbs.					
Total H = 7.17 lbs. =	7.17	0.07 ÷	0.005302 =	13.20 =	1.06
N =	5,671.52	54.43 ÷	0.07377 =	737.83 =	59.15
Totals	10,420.29	100.00	.....	1,247.39	100.00

In these calculations the Volatile matter is assumed to break up into fixed carbon and free H_2.

In comparison with this theoretically calculated gas based on the balance sheet data, there is now given:

Furnace Gas Produced, by Actual Analysis—Dry Gas.

	By volume. Per cent.	Density.	By weight. Pounds.	Per cent.
CO_2 =	16.33 ×	0.11660 =	1.904078	23.99
CO =	22.73 ×	0.07375 =	1.676338	21.12
H_2 =	1.9[illegible] ×	0.005302 =	0.010551	.13
CH_4 =	0.04 ×	0.04228 =	0.001691	.02
N_2 =	58.91 ×	0.07377 =	4.345791	54.74
	100.00		7.938449	100.00

These two sets of data afford opportunity for observing how closely these total gas products check when obtained from different sources.

In the calculations of "Heat in Furnace Gas", the weights used are taken from the "Calculated Furnace Gas".

Table XIV. (Continued)

Heat in Furnace Gases, from 62 to 324 Deg. Fahr. per Ton of Pig.

(Based on Calculated Gas Analysis.)

Gas.	Lbs.	Mean Specific heat.	Temperature Interval, deg.	B. T. U.	Total.
CO_2	2,521.60	0.213160	262	140,826	
CO	2,220.00	0.245093	262	142,556	
H	7.17	3.435620	262	6,454	
N	5,671.52	0.245093	262	364,193	
				654,029	654,029
Dry furnace gas.					
H_2O ...	768.45	0.459758 sensible.	262	92,565	
		1,056.7 BTU. latent.	...	812,021	
				904,586	904,586
Total of wet gas, exclusive of C. from V. M. = 11,188.74					1,558,615

In constructing a total heat balance, the sensible heat entering with the stock must be taken into account. The materials of the charge were each at the average air temperature, i. e., 80.2 degrees Fahr., the base temperature of 62 degrees Fahr. being used as the standard for heat balance.

In these calculations the total amounts of coke, ore and stone charged into the furnace per ton are used, no deduction being made for flue dust formation, as was done on balance sheet, these materials having their mean specific heats based on the wet state.

Heat Entering With Charge. (62 to 80.2 Deg. Fahr.).

Material.	Pounds.	Mean specific heat.	Temperature interval.	B.T.U.
Ore	4,435.30	0.302449	18.2	24,413
Coke	1,927.10	0.212892	18.2	7,467
Stone	1,497.60	0.216026	18.2	5,888

Similarly, the heats contained in the materials leaving the furnace are required.

Heat Contained in Flue Dust. (62 to 324 Deg. Fahr.).

Material.	Pounds.	Mean specific heat.	Temperature interval.	B.T.U.
Flue dust	201.2	0.194200	262	10,228

Heat Contained in Pig Iron.

	B. T. U.
Heat in 1 pound pure iron, from 32 to 2,732 degrees....	450
Heat in 1 pound pure iron, (latent heat of fusion).....	126
	576
Subtract heat from 32 to 62 degrees Fahr. = 30 degrees × 0.1 specific heat = ...	3
Heat required to raise iron from 62 to 2,732 degrees =	573
Total heat in 1 ton of pig (62 to 2,732 degrees Fahr.) =	1,283,520

Heat Contained in Slag.

Heat in 1 pound slag (Akerman, Bell, Richards) 62 to 2,732 degrees Fahr. = 945 B. T. U.
Slag produced = 1,571.45 pounds per ton of pig.
1,571.45 × 945 B. T. U. = ... 1,485,020

In addition to the sensible heats noted above, there also must be taken into account the heats of formation of pig iron, and of slag.

Heat of Pig Formation.

From the balance sheet we find 105.28 pounds of carbon entering into combination with the iron. This is the reaction of greatest heat value, 1,269 per pound of carbon, and will be the only one taken into account.

105.28 × 1,269 B. T. U. = 133,600 B. T. U.

Heat of Slag Formation.

This is a very difficult matter to give in detail. There is, however, a considerable amount of heat given out when the bases, lime and magnesia, neutralize alumina and silica. This is stated by Richards and LeChatelier as approximately 270 B. T. U. per pound of the combined silica and alumina under the existent conditions.

	B. T. U.
Total SiO_2 = 514,298 pounds, from balance sheet. Total Al_2O_3 = 249,950 pounds.	
764,248 pounds × 270 B. T. U.	206,348

The total useful heat in gases, due to their fuel value is:

Total to run furnace; 2503 I. H. P. x 12,000

	B. T. U.	B. T. U.
Due to analyses and quantity.....	10,901,475	
Due to 80 per cent of the useful sensible heat imparted to gases by their passage through furnace burden:—		
Sensible heat in dry furnace gas.....	654,029	
Sensible heat in moisture of same.....	92,565	
Then 0.8 × 746,594 =	597,275	
	11,498,750	11,498,750
The following are estimates of the heat required by furnace under present conditions:—		
Heat used by stoves at 60 per cent efficiency = $\frac{1,393,709}{0.60}$	2,322,850	
Total to run furnace; 1,858 B. H. P. Hrs. × $\frac{24}{405.62}$ × 55,800 B. T. U. (per B. H. P. at 60 per cent efficiency)	6,134,400	
10 per cent loss due to leakage of gas, steam condensation, blowing off boilers and miscellaneous losses.....	1,149,875	
Total to deduct	9,607,125	9,607,125
Surplus heat in gases available for other work.....		1,891,625

This total surplus gas might be considerably increased by providing suitable means of reducing the waste heat in the stove stack gases, resulting in an efficiency of 70 per cent, and by supplying the power requirements of the furnace by gas engines. When using washed gas on stoves and gas engines, which is necessary to secure the higher efficiency, the sensible heat in the foregoing calculation is lost, (597,275 B. T. U.).

Assuming that with gas engines the total power required would be the same as before, the balance becomes:

	B. T. U.	B. T. U.
(Brought forward)		10,901,475
Heat used by stoves with economizers for stack gas at 70 per efficiency; $\frac{1,393,709}{0.7}$ ..	1,991,010	
B. T. U. (B. T. U. per gas engine I. H. P.) x $\frac{24}{405.62}$	1,777,200	
	3,768,210	3,768,210
Surplus heat in gases, etc.		7,133,265

As a matter of interest, comparative values of the surplus gas remaining under the last condition exhibited when stoves of 70 per cent efficiency and gas engine equipment are used, have been added, based upon coal at various prices. However, it should be remembered that the actual value of the furnace gas is somewhat higher than the comparative B. T. U. would indicate, owing to the fact that the gas does not require handling and that it produces no ashes or clinker demanding labor in disposal.

Bituminous coal having an approximate calorific value of 14,000 B. T. U. per pound, is taken here as the standard. The weight of coal equivalent to the surplus gas produced per ton of iron is $\frac{7,133,265}{14,000}$ = 509.52 pounds.

This represents a credit value per ton

Table XV.

FINAL ADJUSTMENT OF ORE ANALYSES.

	Mesabi, 8,929,600 pounds. Per cent.	Mesabi, 8,929,600 pounds. Pounds.	Old Range, 5,463,000 pounds. Per cent.	Old Range, 5,463,000 pounds. Pounds.	Total. Pounds.	Per cent.
SiO_2	5.73	511,666	11.12	607,486	1,119,152	7.78
Fe_2O_3	69.26	6,184,642	73.60	4,020,768	10,205,410	70.91
MnO_2	1.21	108,048	.28	15,296	123,344	.85
P_2O_5	.16	14,287	.12	6,556	20,843	.15
Moisture	14.39	1,284,969	8.76	478,559	1,763,528	12.25
Al_2O_3	3.61	322,359	2.48	135.482	457,841	3.18
CaO	.25	22,324	.78	42,611	64,935	.45
MgO	.22	19,645	.39	21,306	40,951	.28
Ign. loss	5.17	461,660	2.47	134,936	596,596	4.15
Totals.....		8,929,600		5,463,000	14,392,600	100.00

of iron produced with coal at the various prices as follows:

Coal at $1.50 per ton: $509.52 \times \frac{\$1.50}{2000}$ = $0.3821

Coal at $2.00 per ton: $509.52 \times \frac{\$2.00}{2000}$ = .5095

Coal at $2.50 per ton: $509.52 \times \frac{\$2.50}{2000}$ = .6369

Coal at $3.00 per ton: $509.52 \times \frac{\$3.00}{2000}$ = .7643

This estimate of heat required for work in a furnace is only added as a matter of interest, as necessarily some assumptions were made regarding various losses. However, these assumptions regarding these losses have been made as low as experience in this class of work would permit.

(To be concluded.)

Table XVI.

AIR PASSED THROUGH HOT BLAST MAIN AS SHOWN BY PITOT TUBE

Blast pressure	= 15.04 lbs.	Density of hot blast	= 0.0615 wet
Blast temperature	= 833.4 deg. F.	Gross cu. ft. hot blast per hour	= 2,218,134 wet
Aver. reading of Pitot tubes	= 1.252 in. H_2O	Total gross cu. ft.	= 425,881,728 wet
Diam. of main = 3 ft., 1 in.	= 7.467 sq. ft.		

Periodic losses to be deducted:—

57 stoves at 8,987.63 cu. ft.	=	512,295 cu. ft.
40 casts aggregating 93 minutes that Snorter Valve was open and one engine made 12 R. P. M., including 13 minutes for changing Monkey	=	529,000 cu. ft.
49 checks including casts when engines were operating under reduced revolutions and counted equal loss by Snorter Valve	=	567,473 cu. ft.
Total loss		1,608,768 cu. ft.

Actual hot blast entering furnace = 425,881,728 — 1,608,768	=	424,272,960 cu. ft. wet
Corrected to 62 degrees Fahr. and 30 inches Hg. pressure	=	342,979,715 cu. ft. wet
Net hot blast at 62 degrees Fahr. and 30 inches Hg. entering furnace per minute of net operating time	=	30,015 cu. ft. wet
Entire loss from engine to tuyeres = 375,647,275 — 342,979,715	=	32,667,560 cu. ft. = 8.70 per cent

N_2 in air (dry)	= 79.2 per cent
N_2 in air (dry) as blown	= 78.85 per cent
N_2 in gas (dry)	= 58.91 per cent
Ratio	= 1.3383
342,979,715 x 1.3383	= 459,009,753 cu. ft. gas (dry)
Tons metal produced	= 3,245
Corrected gas per ton	= 141,451 (dry)

Refuses to Make Shrapnel

The Berlin Machine Works, of Beloit, Wis., has just refused an order from a representative of the French government for an order of shrapnel that would require two years to fill, while other orders from the French, British and Russian governments, calling for similar war munitions, were turned down, according to Porter B. Yates, president of the company. Mr. Yates said:

"Almost any factory of any size can secure orders for this line of equipment if it wants them, but I don't feel that I care to put my plant at the business of making ammunition. It is entirely out of our line. The magnitude that the shrapnel industry has reached since the outbreak of the war is not realized by the majority of American people."

Ships More Than Required

The eighth annual report of the trustees of the Great Northern Iron Ore Properties, of which an abstract was published in *The Iron Trade Review* recently, seemed to indicate that the Corporation had not shipped the required minimum, but this is not true.

The aggregate of minimum shipments required by the terms of the lease amounted to 27,000,000 tons and the report shows that the actual shipments were 26,573,808 tons, indicating that the Corporation failed by 426,192 tons to ship the required minimum for the years 1907 to 1914, inclusive. The minimum for 1907 was 750,000 tons, of which only 137,270 tons were shipped, leaving a deficiency for that year of 612,730 tons, which was finally waived in the year 1912, in connection with negotiations at the time that the properties which had not been opened for mining by the Great Western Mining Co. were surrendered to the lessor companies in order that the latter might proceed with developments prior to the time that the lease would terminate under notice of surrender on Jan. 1, 1915. This waived deficiency taken from 27,000,000 tons, leaves 26,387,270 as the minimum to be shipped, which is 186,538 tons less than the shipments made. Hence to that extent the Steel Corporation did more than its contract required.

John C. Haswell Elected President

John C. Haswell, of Marion, Ind., has been elected president of the Dayton Malleable Iron Co., to succeed Pierce Schenck, who has resigned to enter business for himself. Mr. Haswell, who becomes part owner of the plant of the Dayton Malleable Iron Co., is vice president of the Marion Malleable Iron Works, vice president of the Marion Gray Iron Foundry Co., secretary and treasurer of the Atlas Foundry Co., all of Marion, Ind., and secretary and treasurer of the Gartland Foundry Co., Terre Haute, Ind.

Obituaries

Charles L. Gilpin, a retired steel manufacturer, died recently at his home in Philadelphia. He began the steel business in St. Louis, where he established a works in 1845.

M. Joseph Ward, for the last nine years superintendent of the galvanizing works of the Youngstown Sheet & Tube Co., Youngstown, died at his home in that city, June 11. He had been in ill health for several months. Mr. Ward was born Aug. 2, 1862, at Athlone, Ireland, and came to the United States when 10 years old. It is stated that he was the originator of the roller process of sheet galvanizing. For several years Mr. Ward was connected with the Aetna Standard Iron & Steel Co., at Bridgeport, O., and was later identified with the American Rolling Mill Co., Middletown, O. He became connected with the Youngstown Sheet & Tube Co. in 1906.

Kenosha is Busy.—Industrial conditions in Kenosha, Wis., are showing steady improvement, according to the monthly report of the Kenosha manufacturers' employment bureau for May, which shows the largest pay roll ever known in Kenosha in the first six months of the year. Every plant in Kenosha is now operating at its full capacity and some 1,400 men have found employment since Jan. 1.

The Pittsburgh section of the American Institute of Electrical Engineers held its regular monthly meeting June 15 in room 2511, Oliver building. Dr. A. A. Hammerschlag, director of the Carnegie Institute of Technology, talked about the San Francisco exposition.

A New England Machine Tool Plant

Interesting Details Covering the Practice of the Putnam Machine Co., Fitchburg, Mass.—How Equipment is Arranged

By E. C. KREUTZBERG

FITCHBURG, Mass., during the next few weeks, will celebrate with proper ceremony one of the most important events in its history. This is the completion of the new plant of the Putnam Machine Co., which recently commenced operating. On June 23, the new plant will be visited by the Worcester branch of the National Metal Trades Association and on June 26 a similar visit will be made by the members of the New England Foundrymen's Association. A few days later, amid the strains of an orchestra, the works will be opened for the inspection of the residents of Fitchburg. The new plant, which is to receive all this attention, embodies in its construction and equipment every advantage for promoting both operating efficiency and the safety and comfort of workmen which can be secured through the exercise of careful forethought and the lavish expenditure of money. Besides being modern in every respect, it is one of the largest machine tool plants in the country, and is the largest in New England specializing in the production of railroad machine tools. In view of these facts, the Fitchburg people are especially proud in the knowledge that the Putnam Machine Co. has made its headquarters there since 1838; in fact, the establishment of the business at such an early date entitles Fitchburg to the privilege of calling itself one of the pioneer American machine tool cities.

It was in 1836 that John and Salamon W. Putnam, who came of a family of mechanics, went to Trenton, N. J., with the intention of starting a machine shop. The panic of 1837 interfered with the carrying out of this intention and the brothers, in the year of the panic, started as J. & S. W. Putnam, in a rented basement in Ashburnham, Mass. A year later, they moved to Fitchburg. At first they devoted themselves to repairing cotton machinery, but soon entered the manufacturing field, turning out gear-cutters; later, they developed a full line of standard tools. The business grew steadily until it was burned out, without insurance, in 1849, and the brothers had to start anew. In 1858, they formed the Putnam Machine Co. and under this name the business continues, it now being owned and operated by Manning, Maxwell & Moore, Inc., New York, who bought it two years ago. The plant which has just been vacated was built in 1866; it shortly will be dismantled to make room for a street which the city proposes to cut through.

The company was the first builder of upright drills with swinging table, on which the work can be moved about under the drill without unclamping. S. W. Putnam, the leading spirit in the organization during the old days, designed the present form of back rest for lathes, and is said to have invented the universal hanger and to have brought out numerous other inventions. Later on, the company began to build Putnam engines, which became famous throughout the world. The company also was intimately connected with the early development of the rock drill, and, in fact, designed and built the first successful drills, those used in the construction of the Hoosic tunnel. Still later, it began to branch out more

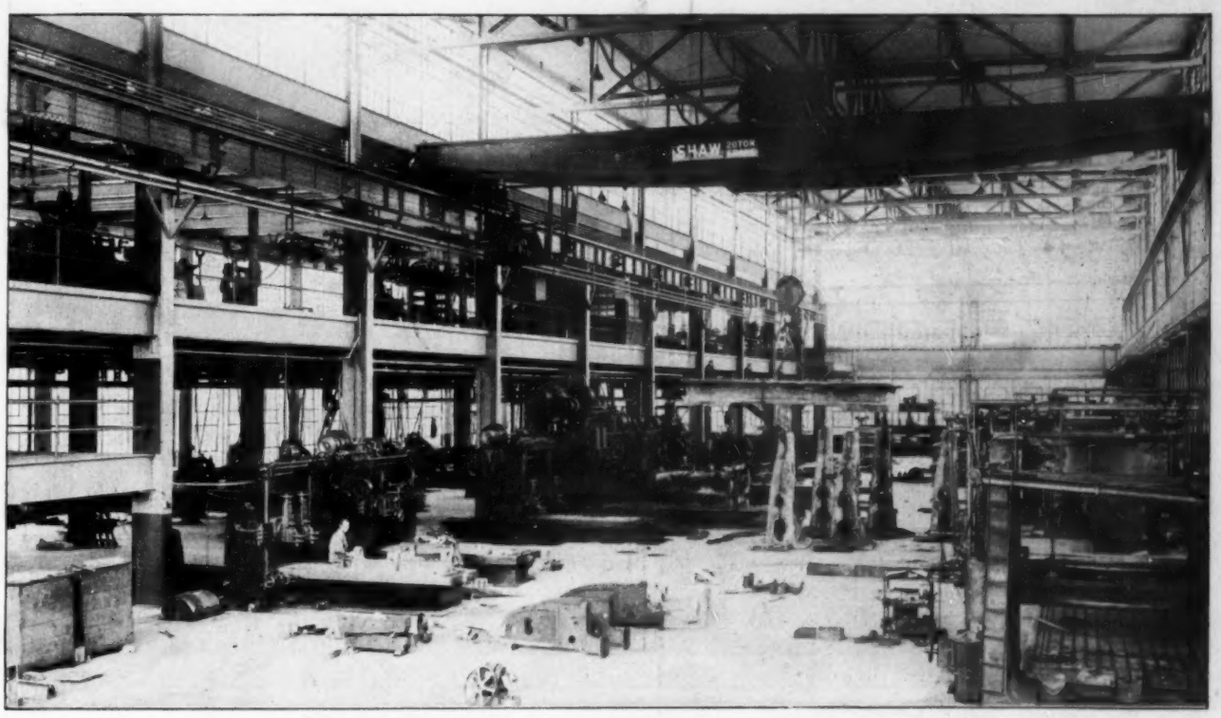


FIG. 1—VIEW OF MACHINE BAYS, SHOWING BALCONY AND A PORTION OF MEZZANINE FLOOR

FIG. 2—VIEW OF ERECTING BAY, SHOWING LATHES, PLANERS AND OTHER MACHINE TOOLS IN PROCESS OF CONSTRUCTION

and more into the manufacture of machinery suitable for railroad shops. At the present time, it continues to specialize in the production of railroad machinery, but also manufactures some miscellaneous machinery. The manufacture of some of the old products, however, such as the Putnam engine, has been dropped.

The products made by the Putnam Machine Co. embrace car wheel boring machines, axle lathes, engine lathes, journal turning lathes, coach wheel lathes, driving wheel lathes, tire lathes, planers, gap lathes, boring mills, car wheel turning lathes and other kinds of machinery. In the old Putnam plant, the tendency was to maintain a separate department for the production of each different kind of machine and to provide each of the departments with a full line of machine tools. In this way, naturally, there resulted much duplication of equipment. The new plant is especially laid out to eliminate such expensive and unnecessary duplication. Instead of a coach wheel lathe producing department, a planer producing department, an axle lathe ducing department, etc., the departments in the main building of the new plant take their name from the classes of machine tools that are located in them. The various machine tools, thus, are grouped as follows: Large planers, small planers, large lathes, small lathes, boring mills, gear cutting machines, drill presses, milling machines, automatic and hand screw machines, etc. In addition, there is a repair department, a polishing department, a light assembling department, a scraping department, etc. All the machines are electrically driven, the larger by individual motors, while the smaller machines are arranged in groups which are belt driven from lineshafts.

The procedure in the main building of the plant briefly is as follows: The

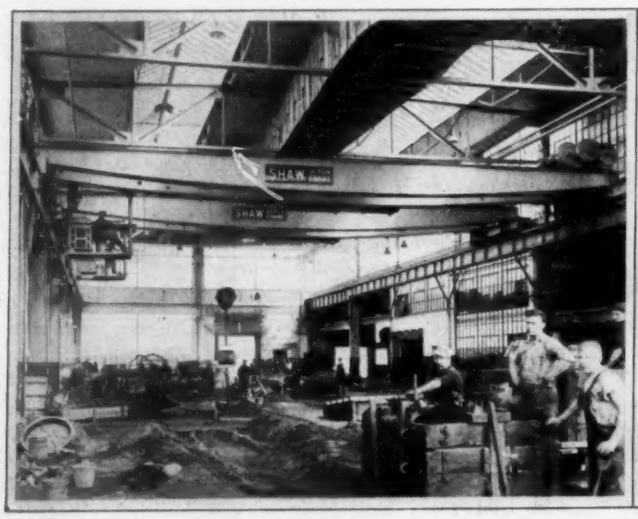


FIG. 3—A VIEW OF FOUNDRY, SHOWING MONITOR SKYLIGHTS AND ALSO DUCT FOR EXHAUSTING SMOKE AND GASES

FIG. 4—VIEW OF NORTH BAY IN FOUNDRY SHOWING BENCH FLOORS IN FOREGROUND

weight of the castings received from the foundry department is checked up and credited to the account of the cleaning room. A route sheet then is made up for each casting or group of castings and after the castings have been machined as specified by the route sheet, they are taken to the erecting floor. Bar stock for making shafting, collars, washers, screws, forgings, etc., also is guided about the shop by means of a route sheet. This specifies the length to which the bar is to be cut, what machining operations are to be performed, etc. After having been machined as specified, the parts made from bar stock also are transferred to the erecting floor, where the so-called "heavy assembling" of complete units is done. Another important department is the light assembling department, where two or more units are assembled into an "assembled part". These assembled parts are scraped, in still another department, in order to secure proper alignment.

The routing of work through the various departments, naturally has an important bearing on the operating efficiency of the plant. The management now is perfecting the details of a routing system which promises to be extremely simple but effective. Great attention also is being bestowed on the matter of inspecting and testing the machines after they have been erected, and an elaborate equipment now is being installed for this purpose. The tests to be conducted include both running and load tests.

It formerly was the picturesque custom at the Putnam plant, as at many other plants in New England, to employ oxen extensively for hauling material. Ox-drawn trucks were made use of especially in making shipments of machinery, since the old Putnam plant was several hundred feet distant from a railroad switch. When the transfer of equipment from the old shops to the new shall have been entirely completed, as will be the case within a week or two, the usefulness of the oxen at this plant will be at an end, since modern methods of transportation have been installed throughout.

The new plant is provided with two spur tracks from the Boston & Maine railroad; both of these enter the main building, so that machinery ready for shipment may be loaded directly into the railroad cars with the aid of cranes. The main building is divided into four bays, all of which are 60 feet wide. One of the railroad tracks employed for shipping, enters the bay in which the erecting shop is located; this bay contains two Shaw electric traveling cranes, one having 20 and the other 30 tons capacity. The bay into which the receiving track enters is equipped with a 20-ton crane. The north bay, in which the small planers and the large lathes are grouped, is equipped with three 2-ton Shepard hoists. In addition, the main building is provided with an industrial track for transferring finished parts from the machine bays to the erecting floor, with a number of portable 1-ton cranes, and with two elevators which communicate with a balcony floor and a mezzanine floor, located in the north bay. The main building is connected with the foundry by a monorail system for transferring castings.

The main building or machine shop is 220 x 300 feet; the balcony floor, which quarters the light machinery department, is 50 x 300 feet, and below the balcony, at the northwest corner, is the mezzanine floor, 50 x 75 feet, which is used as a stock room. Both balcony and mezzanine floors are provided with platforms which are commanded by the crane. A portion of the ground floor of this building is partitioned off as a locker room, and, adjoining this is a small dispensary containing a full equipment of first aid apparatus. Other buildings which comprise the plant include the foundry, power house, blacksmith shop, pattern shop and office. The foundry is 120 x 200 feet, with mezzanine floors, 30 x 75 and 16 x 33 feet, a charging floor, 49 x 50 feet, and a basement 29 x 74 feet. The power house is divided into an engine room, 36 x 48 feet, boiler room 48 x 48 feet, and basement, 36 x 48 feet. The blacksmith shop is 40 x 60 feet, the pattern shop is four stories, 50 x 100 feet, and the office 50 x 100 feet. Altogether, the build-

FIG. 5—VIEW OF FOUNDRY SHOWING CUPOLA AND CORE DEPARTMENTS AND ALSO OPENING IN END WALL FOR RUNNING CRANE INTO YARD

ings in the new plant have a total floor space of 154,586 square feet, which compares with approximately 70,000 square feet in the old plant.

All these buildings are of uniform construction, being of the steel frame and concrete type, faced with brick. The floors are of reinforced concrete and the roofs are of the same material, supported by steel trusses and covered with tar-paper and gravel. The uniformity of construction and appearance also extends to the interiors of the buildings, which are painted in yellow as a body color, with drab trimmings. These colors were selected because of their property of absorbing a minimum amount of light, thus giving rise to no glaring effects and sparing the eyes of the workmen. Approximately 75 per cent of the wall and roof area of the plant is of glass, and, in addition to the splendid natural illumination thus provided, ample ventilation is afforded by the use throughout of steel sash equipped with operating devices. The roof of the north bay of the main building is of the saw-tooth type, with the windows facing the north. The second bay from the north, which contains a crane runway, is of the monitor type. The third bay is of the saw-tooth type, with windows facing the west. The south bay, also containing a crane runway, is of the monitor type. The foundry, which is divided into a center bay, 60 feet wide, and side bays, each 30 feet wide, has a monitor roof, which contains two skylights running the full length of the monitor.

A remarkable feature of the plant, considering its size, is the fact that no power-generating facilities have been installed. The plant is operated entirely on power furnished by the Connecticut River Power Co. The current is received at 6,600 volts and, for power purposes, is stepped down to 550 volts by three 150-kilovolt-ampere transformers located in the power house. To supply the lighting circuit, the current is further stepped down to 110 volts by two 50-kilovolt-ampere transformers. The power house contains a 225 - horsepower motor-generator for furnishing direct current for operating the cranes throughout the plant. It also contains a 16 x 10 x 14-inch air compressor, driven by a 100-horsepower motor, which furnishes compressed air for operating the portable pneumatic drills, vibrators, sand blast apparatus, and other pneumatic apparatus throughout the plant.

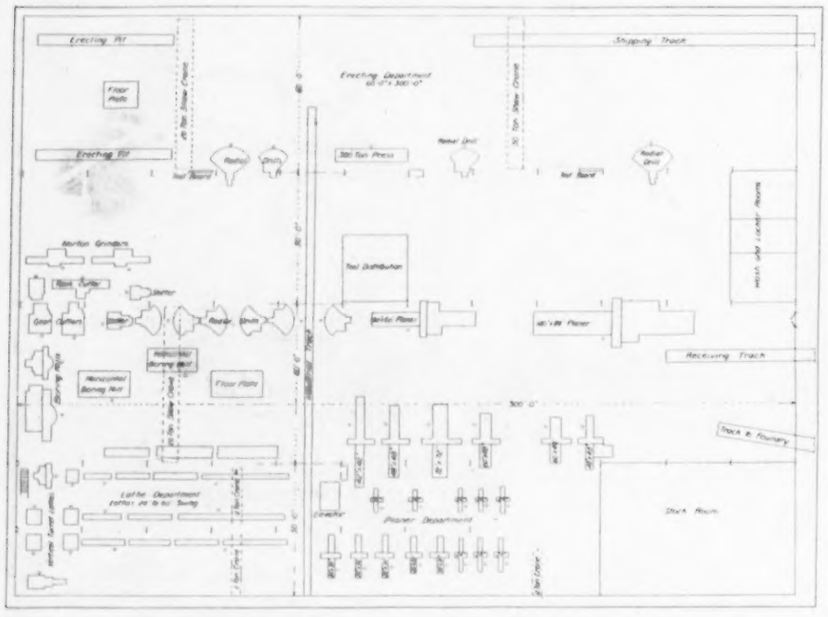


FIG. 6—PLAN OF MAIN BUILDING IN NEW PLANT OF PUTNAM MACHINE CO., SHOWING HOW MACHINES ARE GROUPED INTO DEPARTMENTS

A feature which reflects the care that has been taken to insure the comfort and well-being of the workmen is the gigantic heating system which extends through all the buildings, having approximately 50,000 square feet of radiation surface. This system is of the hot-water type, and is fed by two boilers of the Babcock & Wilcox type, each built to withstand 200 pounds pressure. These boilers, which are located in the power house, are the only ones in the plant. Space has been reserved for a third boiler to be installed if necessitated by future extensions to the plant. Splendid artificial illumination is afforded by the liberal distribution of 750-watt incandescent lamps throughout the works. In the main building these are arranged in parallel rows 26 feet apart, with the lamps spaced 50 feet apart in each row, with alternate spacing of adjacent rows.

Besides the liberal use of steel window sash and operating devices, the foundry is provided with other ventilating facilities. The monitor roof is provided with a number of ventilators and, in addition, there is a system which is capable of entirely exhausting the air from the foundry every 10 minutes, thus insuring a constant supply of fresh air. The use of this system effectually eliminates the old foundry trouble of murky atmosphere due to an accumulation of smoke and gases. This system consists of a large chamber, or duct, located under the monitor roof, which communicates with a large exhaust fan. The duct is provided with a large number of openings which can be made of any desired size by automatically adjusting the vanes or gates with which they are provided. The fan, which is motor-driven, exhausts the air from the duct, and, in turn, from the foundry, and discharges it into the atmosphere. An interesting feature of this apparatus is that it can be employed for heating the foundry. The heating is accomplished by inducing air through a series of specially designed cast iron radiators and passing it into the foundry at a height of about 10 feet from the foundry floor.

The foundry is equipped with two cupolas. One is of the Whiting type, 66 inches in diameter, and has capacity for melting 18 tons of iron per hour. The other cupola is of the Colliau type and is 42 inches in diameter. The larger cupola is provided with pneumatic charging machines. Blast for this cupola is furnished by a positive pressure blower of the Wilbraham-Green type, and for the smaller cupola by a Sturtevant fan is provided; both are motor driven. The blast is measured by the use of a Clark blast meter.

The cupola charging department embodies some unique features. Alongside the foundry is a yard employed for the storage of raw and other materials. This is commanded by a 5-ton electric traveling crane of the Shaw type, which has a span of 100 feet and is mounted on a runway 325 feet long. Through the yard, parallel to the foundry, runs the receiving track. The pig iron is unloaded with a magnet. Both pig iron and coke are elevated, as required, to the charging floor, which projects out into the yard so as to be commanded by the crane. The projecting portion of the

charging platform is partitioned into a number of bins for separating the various grades of pig iron and the coke is dumped into a bin in one corner. For handling the material there are a number of steel trucks, eight for pig iron and four for coke. These are provided with swinging side doors, in order that the contents may readily be discharged into the larger cupola by means of the charging machines. The charging platform is equipped with two Fairbanks dial scales of the springless type, which, in turn, are provided with platforms that are flush with the surface of the platform. These scale platforms are located in front of the pig iron bins and extend almost entirely across the charging platform. Thus the work of loading a truck with the proportions of each grade of pig iron required to make a given mixture is rendered very simple; it only is necessary to roll the truck along, taking on as much iron at each pile as is desired. Foundry scrap is brought to the charging floor by means of a 1-ton elevator.

Molding sand, core sand, facing, clay, gravel, etc., are stored in the concrete cellar beneath the foundry. The materials are discharged into this cellar through chutes. The cellar communicates with the foundry by means of a spiral stairway and a hatchway. When sand or other materials are required in the foundry they are loaded into a specially designed bucket, of which there are a number, and elevated into the foundry by a crane.

The cellar also contains three coke burning furnaces for furnishing heat to the core ovens, which are located in the south bay of the foundry. These ovens are of the Whiting type and two are equipped with heat ports with sliding covers; the ports are located at the front and back of each oven; the sliding covers permit concentrating the heat either at the back or front of the oven as desired. By opening both ports, of course, uniform distribution of the heat may be had throughout the oven. The ovens are provided with the usual flues at the bottom of the side walls, and with top flues; the latter are kept open long enough to permit the escape of the vapor and smoke which accumulate at the beginning of a bake. These ovens are each 10½ x 16 x 8 feet, the height being given last. They are designed to accommodate four trucks each, two abreast. A third Whiting core oven, 6 1-3 x 7½ x 8 is provided; in addition to accommodating a carriage, it contains an alcove, 6 x 6 feet, for the accommodation of a rack. Furthermore the core department contains two drawer type Whiting ovens. The core department also is equipped with a 15 x 15-inch jolter, for ramming cores, and with a 5-ton hand-operated crane for loading the core trucks.

The cleaning department also is located in the south bay of the foundry. This contains a Paxson sand blast apparatus, and two tumoling barrels, 36 x 48 inches and 48 x 72 inches, respectively. A 5-ton hand-operated crane shortly will be added to the equipment in the cleaning room. The south bay further contains a brass foundry; this is equipped with three crucible pit furnaces. In addition, the west bay contains a locker and wash-room for the molders.

The main north bays of the foundry are given up to molding purposes.

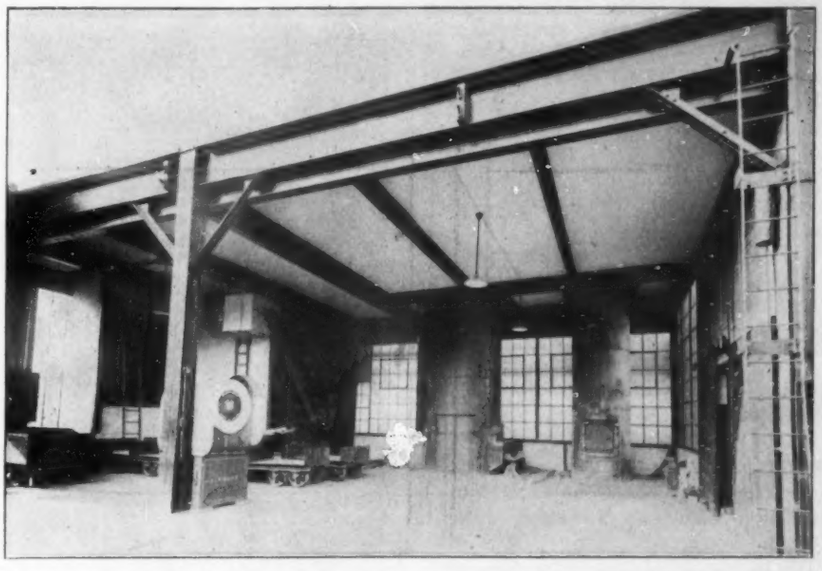


FIG. 7—CHARGING FLOOR SHOWING CHARGING MACHINES, SCALES AND TYPES OF TRUCKS EMPLOYED FOR TRANSFERRING COKE AND PIG IRON TO CUPOLAS

The main bay is commanded by two Shaw electric cranes, having capacity for handling 10 and 20 tons, respectively. These cranes are mounted on a runway which extends out into the flask storage yard for a distance of 100 feet. The north bay is equipped with a 3½-ton Shaw crane and a monorail system. Additional small cranes will be installed in the future. The company is making preparations to adopt machine molding methods on a more extensive scale than in the past. The molding machines now in use embrace a combination jolt, roll-over and pattern-drawing machine of the Herman type, and a similar machine of the Osborn type, the former with a 24 x 30-inch and the latter a 30 x 54-inch table. Work has been commenced on the installation of a 50 x 50-inch Herman jolter.

Pools Help in England

The manner in which trade pools, declared illegal in this country, are benefiting Welsh tin plate makers is mentioned by J. Mort, of Swansea, Wales, in a letter to *The Iron Trade Review*. Mr. Mort not only speaks about pools, but describes industrial conditions in the tin plate industry in Wales. His letter in part follows:

"Everything is abnormal. Concerning tin plates with which trade I am best acquainted, I may say that we have many mills idle. The idle mills are distributed over many plants so that the burden is not borne by few firms, this being effected by a pooling arrangement, fixed according to capacity of plants, and which was set up about 12 or 15 months ago. The result is, therefore, that very few plants are entirely closed down and those few are compensated from the pool.

"The problem of unemployment in this trade, as in all other trades at present, is non-existent, this condition being largely due to so many of our young men having joined the navy or army, and again to the employment of extra hands in the armament works.

"As you know perfectly well, the price of tin plates in this country is very high, hence the increased exports of American tin plate to such markets as China and Japan. Almost every other trade in this part of the country is booming and high wages are being paid, which explains the hitherto unprecedented emigration of even Americans to this country."

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

Austin D. Mixsell, who has been made a vice president of the Bethlehem Steel Co., has reached that post after a period of 18 years in the service of the company, both in the manufacturing and sales departments. He joined the Bethlehem organization in 1897 in the metallurgical department and the five years succeeding were spent there in special steel making and in experimental work. After several years in the open hearth, treatment, forge, rolling mill, foundry and physical laboratory departments, he became chief of the estimating and inspection departments. In 1906, he was made sales agent in charge of New York and New England sales and in 1908 was promoted to the position of general sales agent, with headquarters at South Bethlehem, which he has held up to the present time. Mr. Mixsell is a native of Easton, Pa., and is 41 years of age. He was educated at the public and Friends' schools in Easton and in Philadelphia. He is a member of the Engineers' Club of New York and various other clubs and organizations.

William R. Allen, of Worcester, Mass., a deputy collector of internal revenue for the district of Massachusetts, has resigned to accept a position with the Norton Co., Worcester, Mass.

John W. Harrington, of the Harrington & Richardson Arms Co., Worcester, Mass., who is in Paris, has been summoned home by cable, as the company is considering the manufacture of rifles for war purposes.

Frank D. Frawley is now in charge of the western district of the Corliss Carbon Co., Bradford, Pa., manufacturer of motor and generator brushes exclusively, which has opened an office at 1052 Peoples Gas building, Chicago.

W. E. Stalnaker has been chosen vice president and general sales manager of the Pathfinder Co., Indianapolis, motor car builder. Mr. Stalnaker has been interested actively in the advancement of motoring in Chicago for the past five years.

Albert M. Powell, of the Woodward & Powell Planer Co., Worcester, Mass., who has lately returned from a three years' trip to Germany and other European countries, spoke of his experiences abroad at a recent meeting of Boston branch, National Metal Trades Association.

Joseph Battles has been appointed district sales manager for Denver for the Terry Steam Turbine Co., Hartford Conn. He will cover the states of New Mexico, Colorado, Wyoming and the western portion of Nebraska. Mr. Battles' address is 326 First National Bank building, Denver, Colo.

George F. Staal, city engineer of Milwaukee, was elected president of the Engineers' Society of Milwaukee at the annual meeting held at the

AUSTIN D. MIXSELL

Plankinton hotel on June 9. A. E. Manchester, superintendent of the Milwaukee shops of the Chicago, Milwaukee & St. Paul railroad, was chosen vice president.

Wm. B. Walker, president of the American Thermos Bottle Co., suffered a fracture of the skull and other injuries when his automobile skidded near Westerly, L. I., June 9. He is expected to recover. C. K. Bisscher, superintendent of the company's factory at Norwich, Conn., who was in the car, escaped with a few bruises.

Charles S. Powell, manager of the Factory Appliance Co., Illuminating building, Cleveland, will start June 19 for a short business trip to England for some financial interests there. Mr. Powell will sail on the French liner Rochambeau going via Bordeaux and Paris. While abroad, he expects to investigate the conditions surrounding the iron and steel and general machinery business in England and France. His address in London will be, care Anglo-American Oil Co., 38 Queen Anne's Gate, and his cable address will be "Powell, Medialis, London".

Herbert M. Wilson, engineer in charge of the Pittsburgh experiment station of the United States bureau of mines, has resigned to go into private business, according to advice from the national capital. Mr. Wilson was closely associated with Jos. A. Holmes in the inception and development of the bureau of mines.

O. E. Lafleur, formerly connected with the Berwind-White Coal Mining Co., has been placed in charge of the coal department of the Harris-Smith Coal & Coke Co., Uniontown, Pa. On July 1, the Harris-Smith company will move its general offices from Uniontown to the First National Bank building, Pittsburgh, and the shipping department only will be retained at Uniontown.

James A. Farrell, president of the United States Steel Corporation; John D. Ryan, president of the Amalgamated Copper Co., and James J. Hill, chairman of the Great Northern railway, have been appointed a committee of the national foreign trade council to take up with the federal trade commission the question of co-operation of American exporters in extending foreign trade.

E. H. Fish has been appointed to the position of supervisor of the educational department of the Norton organization in Worcester, Mass. He will carry forward the development of the Norton apprentice courses organized about a year and a half ago by J. S. Comstock. Mr. Fish was graduated from Worcester Polytechnic Institute in 1892 as mechanical engineer. From that time until 1903, he was associated with his father in the H. C. Fish Machine Works. From 1903 to 1909, he was instructor of mechanical engineering in Worcester Polytechnic Institute. In the latter year, through the influence of Milton P. Higgins, he was selected to organize and direct the Boys' Trade School, in Worcester. From 1914 until he entered on his new duties, Mr. Fish was a member of the editorial staff of the *American Machinist*.

Competitors and Customers Unite

In Praising Policy of the Steel Corporation—Press Commends the Recent Decision—Question of Appeal Discussed

NOT a discordant note has been struck in the comment in regard to the decision of the United States court in favor of the United States Steel Corporation. The only question, apparently, about which there is any difference of opinion, is as to whether the case should be carried to the Supreme Court. James Bowron, president of the Gulf States Steel Co., in an article in a Birmingham newspaper, says the government now has enough problems on its hands without giving any further thought to the Steel Corporation suit which, he believes, ought to be dismissed. He says:

"I hope it may not be too much to trust that, in view of the character of the evidence and the unanimous decision of the impartial judges who have given long and patient consideration thereto, the department of justice may feel itself content to refrain from taking an appeal to the Supreme Court of the United States, which would postpone the final decision for perhaps another year or longer. It seems to me that it is greatly to be desired at the present time that, with the foreign problems confronting the administration, all the ranks of Americans should close up solidly to strengthen the President's hands. There are sufficient problems at this moment of great importance on the outside of the country to require the undivided thought and action of our government, and I am sure that the sentiment of this country would strongly endorse the President of the United States if he should give an intimation to the attorney general that this matter be now regarded as res judicata."

Leading newspapers of the country have many kind words to say about the Steel Corporation. The *New York Sun* is opposed to appealing the case and says there is no good reason for continuing the attack on that form of legitimate co-operation which has come to be knwn as big business. The *New York Tribune* remarks that the complete victory of the Corporation will be taken to prove that the era of what might be called experimental prosecution under the Sherman anti-trust act has come to an end. The *Philadelphia Ledger* thinks that the opinion will do much to clarify the whole murky atmosphere with respect to trusts. "It is a great victory for the Steel Corporation," says the *Indianapolis News*, "but nevertheless the court will keep a watchful eye on it, and there is the trade commission to be reckoned with." The *Buffalo Express* thinks that the decision could not have come at a better time to benefit business. The *Chicago Herald* says that pending the decision by the Supreme Court, the Steel Corporation has the prestige of a significant victory. The *Chicago Tribune* expresses the opinion that the decision gives a real foundation for business optimism. The *Kansas City Star* remarks that in a good many respects the Steel Corporation has set a commendable example to other corporations. The *Boston Herald* declares that the pendulum is swinging back from the excesses of regulation to which the government has resorted. The *Washington Post* says that the Sherman law is being enforced with common sense and discretion. The *Cleveland Leader* says the decision will go far toward bringing about better times and promoting the general prosperity of the American people. The *Springfield Republican* believes that the decision will hearten big business to an extraordinary degree. The *Cleveland Plain Dealer* is of the opinion that the result of this law suit does not mean that the public is to be subjected to the aggressions of unprincipled combinations, but merely that the Sherman law is to be interpreded in the future in the light of modern knowledge touching corporations, their nature and their practices.

The following comments are from competitors and customers of the Corporation:

Will Check Unwise Legislation

By Justus H. Schwacke,

Wm. Sellers & Co., Inc., Philadelphia

I BELIEVE it will help much to restore confidence in the business mind of the country and it will probably check latent efforts to instigate further mischievous legislative attempts against large business enterprises that have been successful and would continue to be so but for such unwise interference.

Better Outlook For Business

By W. L. Brown

President, Federal Furnace Co., Chicago

I REGARD it as practically the initial movement for justice and fair dealing to the manufacturing interests of our country, and the recognition that the honesty of purpose and the ability of men handling large operations is being at last realized; and as the necessity for future growth of our industries means co-operation and consolidation, under proper and clearly defined laws, our manufacturing interests will be able to do the business of the country and of the world in a far more satisfactory manner than has prevailed for the past 10 or 12 years.

A Just Decision

By Alexis W. Thompson

President, Inland Steel Co., Chicago

THE decision certainly is in harmony with justice and fair dealing, and the effect surely will be favorable on general business conditions and otherwise.

Will Encourage Big Enterprises

By H. S. Daniels

Publicity Manager, Kissel Motor Car Co., Hartford, Wis.

WE BELIEVE the supreme court decision in the government action to dissolve the United States Steel Corporation will be distinctly tonic and beneficial to the business interests of the country. It clears up doubts as to the hitherto obscure essence and intent of the Sherman law and the direct result will be to encourage initiative in big enterprises.

War-End Dumping

By J. G. Battelle

President, Columbus Iron & Steel Co., Columbus, O.

I AM SURE that the decision of the United States district court in the Steel Corporation case marks the beginning of the gathering of forces which will result in

the birth of a new era of prosperity, which will be complete with the restoration of a protective congress, to prevent us from war-end dumping imports.

Our courts demonstrate that their sheltering arms sustain the friendless business man as well as all others wrongly accused—also that size and success are not criminal.

Let all men of affairs resume their self-respect, with active mutual helpfulness, and service to the public.

Came at Opportune Time

By C. G. Thomas

President, Western Reserve Steel Co., Warren, O.

WE SURELY feel that the United States court decision favorable to the United States Steel Corporation came at an opportune time and will be a very strong factor for better business conditions industrially.

We look for it to have an immediate effect.

Will be Guided By Corporation

By F. B. Richards

M. A. Hanna & Co., Cleveland

I THINK the decision is in every way in harmony with justice and fair dealing, especially that part of the decision which relates to the fact that business might be big and not harmful. The facts in the case since the formation of the Steel Corporation have shown the growth and extension of its competitors to be faster than its own. The effect on general business will undoubtedly be favorable, as many large concerns will shape their business methods largely after those of the Corporation, feeling they can now do so with confidence.

Don't Carry It Up

By B. F. Bourne

President, Bourne-Fuller Co., Cleveland

WE STRONGLY feel that the decision of the federal court in favor of the United States Steel Corporation is just and in line with the facts developed.

We sincerely hope that the attorneys for the government will not undertake to carry the case to the supreme court and prolong an expensive litigation, which, we feel, is doing much harm to the trade, with no promise of corresponding benefits to follow.

Have Improved Practice

By R. H. Sweetser

President, Thomas Iron Co., Easton, Pa.

THE decision is the only verdict that could have been truthfully rendered on the evidence submitted. It was a judicial expression of what all of us in the iron business knew beforehand.

The effect on general business conditions will be favorable. The independent iron and steel manufacturers have been benefited in many ways by the Steel Corporation. We do not know of any case of "unfair methods", and in our dealings with the Steel Corporation as a purchaser, we have found that they must meet plenty of competition.

In the scientific investigation of iron and steel practice, they have been able to do much that the smaller operators would find impossible to do. They have done much to increase the efficiency of all kinds of iron and steel work, and they have been foremost in the welfare work for their employes.

May They See a Great Light

By the Wellston Steel & Iron Co., Wellston, O.

THAT the decision in the Steel Corporation case is in harmony with justice and fair dealing is made clear by the practically unanimous opinion of the press and individuals who express themselves regarding it.

The effect on general business will be favorable, not on account of stimulating trade immediately, perhaps, but through the fact that the rule of reason and common sense is coming into vogue and that public sentiment is shifting to the view that if this country is to prosper, and labor and capital have employment, it must do business. It is being gradually and generally discovered that labor will not find employment, capital seek investment and industry flourish when business, little and big, is dealt with unfairly and unjustly, discouraged and persecuted.

It is to be hoped our administrative, legislative and political leaders have seen a great light and will follow the path it points out.

Promise of Vigorous Development

By S. J. Llewellyn

President, Interstate Iron & Steel Co., Chicago

IN THE writer's opinion, the Steel Corporation decision is in harmony with justice and fair dealing, and shows an enlightening of fair and broad minds after much application to study of the question. It also shows a reaction from the idealist sentimentality of the near past and portends a promise of a more vigorous development in the near future.

We, as a people, have been dreaming in apparent security, while the whole world outside has been seething with world-wide projects and developments.

There is no question in the writer's mind that the decision will help restore confidence, and thus aid return of more prosperous times.

Lessening of Pressure

By Nicholas P. Lloyd

Newton Machine Tool Works, Inc., Philadelphia

IT IS our belief that this decision will have a beneficial effect upon general business conditions, as it is only another indication of the lessening of the pressure upon corporations, and large ones especially.

We believe that the decision will square itself with justice and fair dealing, as the indications all are that the practices complained of had ceased before action was taken.

Live and Let Live

By W. H. Purcell

President, Alliance Machine Co., Alliance, O.

THE Steel Corporation decision is the first ray of sunshine the business world has seen for many a day, it being based on the broad proposition of live and let live and could well be applied in many other ways at the present time. The effect cannot be otherwise than favorable to business in every branch.

Regret Case Not Finally Settled

By F. A. Scott

Secretary, Warner & Swasey Co., Cleveland

THE Steel Corporation decision was a source of satisfaction to me in the belief that it heralded a new era in American business. I took it to mean that we

had at last worked out a satisfactory system under which business might develop to any size without necessarily being regarded as a menace. I believed it heralded a new era of co-operation among all classes of our business people. I believed it would produce renewed confidence and, consequently, added prosperity for all.

For these reasons, and many unmentioned, I regret to learn the news that the case is not yet to be considered settled.

Recognizes Clean Methods

By E. G. Grace

President, Bethlehem Steel Co., South Bethlehem, Pa.

WE WERE most gratified to learn of the decision in favor of the Steel Corporation in the government's dissolution suit against it. It appears to us significant in the recognizing, by the court, of clean and fair business methods, and should be beneficial in its effect not only through the entire steel industry, but should have a wholesome effect on general business conditions as well.

Already Has Good Effect

By M. H. Barker

General Manager, American Tool & Machine Co., Boston

WE THINK that the Steel Corporation's decision is in keeping with justice and fair dealing. We have no doubt that the effect on general business conditions will be very favorable; in fact, we can see now it has had a good effect in stimulating business.

Will Have Wholesome Effect

By E. A. Stillman

President, Watson-Stillman Co., Aldene, N. J.

IT IS the writer's opinion that the decision is in harmony with justice and fair dealing, and will have a very wholesome effect on general business conditions, due to the encouragement it gives both to the business man and the investing public.

Most Important Event of the Year

By Wade A. Taylor

President, Deforest Sheet & Tinplate Co., Niles, O.

WE CONSIDER the Steel Corporation decision the most important event of the year thus far. From what we know of the Steel Corporation as a competitor in one of their lines, we consider the decision in absolute harmony with justice and fair dealing, and believe that it points the way for the now-known legitimate conduct of business.

Pointer For Legislators

By E. A. Wurster

Secretary and Treasurer, The Falk Co., Milwaukee

WE ARE well pleased with the opinion rendered in the Steel Corporation litigation. We believe the decision is in harmony with justice and fair dealing and will surely tend to improve business.

If congress and the various legislatures would quit passing obnoxious laws, many of which are found illegal when tested out, and allow corporations and business men to do business as in the past, this country would soon feel the beneficial effects of such action.

Now Revise the Tariff

By A. F. Huston

President, Lukens Iron & Steel Co., Coatesville, Pa.

IN REGARD to the decision of the United States court in the Steel Corporation suit, I feel very optimistic. I believe it will go a long way toward a revival of business. The next step will be to revise the tariff, as well as other helps to business which Washington can give, if it will.

Why Not Dismiss the Case?

By F. E. Nulsen

President and General Manager, Missouri Malleable Iron Co., East St. Louis, Ill.

IN VIEW of the strong case which the Steel Corporation made, we were at a loss to understand why the government did not dismiss the case. Every single contention of the government was clearly disproven, the Steel Corporation bringing out the facts that it had dealt fairly with its competitors in a spirit of "Live and let live", that it had materially improved the condition of its workingmen, not only as to wages paid but in the line of social betterment, that it had been one of the greatest factors in building up our export trade and from every standpoint was a benefit and not a detriment to the industrial and commercial life of our country.

The recognition of these facts by the court should go a long way toward helping general business conditions and, particularly, the iron and steel industry.

Not Criminal to Succeed

By C. M. Wambaugh

President, Columbus Chain Co., Columbus, O.

WE ARE pleased beyond expression at the decision in favor of the Steel Corporation, in the suit brought by the government three and one-half years ago. We believe that the length of time it has taken to arrive at a decision in this case is in a large measure responsible for the business depression that we have had and are now going through, and also believe that this decision will restore confidence in the business world and the result will be beneficial, and produce a feeling that it is not criminal to create and operate a successful business.

Corporation a Great Stabilizer

By Edward E. Hughes

General Manager, Franklin Steel Works, Franklin, Pa.

THE DECISION of the federal district court, handed down at Trenton, N. J., has come at the psychological moment when our state of mind very much needed something tangible in the shape of encouragement. This unanimous decision causes us to heave a sigh of relief. That doesn't sound entirely consistent, and yet it is very much so.

The smaller steel companies have been going along for several years in a timorous way, fearful that the United States court might make a "wrong guess", and order a separation of the constituent companies of the United States Steel Corporation, the result of which, I am firmly convinced, would have brought chaos to the steel and iron business. It would have brought back in aggravated form the old barbarism of "cut-throat competition"; and it isn't necessary to tell a man up a tree who would be the first to go down.

It is my settled conviction that the United States Steel

Corporation has been a great stabilizer in the steel business. In its clean, open and legitimate manner of conducting its business it has become the great stabilizer to business generally. Judge Gary brought into active life the beneficent principle of co-operation. The courts have frowned, in a sense, upon this principle, and while it is not legally permitted in concrete form, it is still today a living, moral force that has come for good ends.

The decision is entered. It will be regarded generally as eminently proper, fair and equitable. I have no fear of the result on appeal; for magnum est Veritas et praevalabit—great is truth and it will prevail.

The decision will have a favorable effect on general business conditions. Of this I feel confident. It eliminates that dread and fear, which has been hard to diagnose.

Would Extend the Rule of Reason

By John A. Topping

Chairman, Republic Iron & Steel Co., New York.

THE COURT'S decision in the Steel case is, unquestionably, just and fair, and for this reason the business public are pleased. Furthermore, the decision settles the question of legality, where size of the Corporation is involved.

The court's definition of "monopoly" seems to me to be decidedly constructive in character, inasmuch as "the size of what has been acquired is not a determining factor, but that the power of the portion of trade not acquired is".

The decision should encourage the growth of large corporations, particularly where economy and efficiency is suggested by size; it is, however, rather discouraging to the spirit of co-operation, by its reference to Gary dinners. Business generally, I think, would welcome an extension of the rule of reason to the point of removing the ban on combination or co-operative associations maintained for the purpose of promoting domestic business, rather than for export business only, for without co-operation, ruinous competition cannot be avoided, neither can stability to markets or general prosperity be maintained for any length of time.

Disappointment is expressed by the decision of the government to appeal the case, notwithstanding the complete victory of the Steel Corporation, but perhaps a final ruling by the higher court is desirable in order to remove all future doubt from the minds of business, as to the law in the case. The decision has had a good effect generally on business sentiment.

Hope It Will Be Carried Higher

By George A. True

President, Northern Engineering Works, Detroit

WE ARE very much pleased by the decision. We felt from the first that this suit was brought largely for political effect and we are delighted that it has met the fate which an action of this kind deserves. We sincerely hope that it will be carried to a higher court so that the questions at issue will be settled finally and definitely, but even the decision of the lower court should have a decidedly beneficial effect on the iron and steel business.

Best Example of Big Business

By Geo. F. Steedman

President, St. Louis Steel Foundry Co., St. Louis

I AM GREATLY pleased with the court decision concerning the United States Steel Corporation. I think the Corporation is constructive, and the best example we have of management of big business.

The Steel Corporation has removed the great fluctuations in bar steel and steel products, so that we no longer have to speculate in buying our steel.

General Satisfaction

By H. H. Rice

President, The Waverly Co., Indianapolis

I THINK the decision is in harmony with justice and fair dealing. Secondly, it is certain that the effect on general business conditions has been favorable, as evidenced in the "stock market".

Other proof is not so readily shown, but the general satisfaction in business circles at the decision indicates, I believe, a better feeling which is usually quite sure to result in better business.

Makes the Way Clearer

By W. V. Spaulding

Secretary, The Graton & Knight Mfg. Co., Worcester, Mass.

WE ARE strongly of opinion that the recent decision with regard to the Steel Corporation is entirely in accord with justice and fair dealing. We believe its effect on general business conditions can not be anything but favorable, relieving as it does to a certain extent the cloud of uncertainty which has of late overshadowed all business transactions. Anything which will make clear to business men just what they may do in the way of positive declaration cannot fail to be of help.

Nine Millions

Of Shells Ordered for Allies—Report from the Shell Committee

Toronto, June 15.—At the annual convention of the Canadian Manufacturers' Association held here the most noteworthy feature was an address by Brig. Gen. Alex. Bertram, chairman of the Canadian shell committee, setting forth what had been effected in furthering the manufacture of shells in Canada. On the receipt of large orders for shells from the British government, preliminary steps for the establishment of the industry on a large scale were taken at a conference on Sept. 2 between the military authorities and leading manufacturers. The shell committee was formed comprising military men, experts and prominent manufacturers, and the work was organized. It was agreed to supply all the component parts of shells free of charge to manufacturers who would undertake the work of finishing and assembling the complete shells, thus relieving the smaller manufacturers of the need of carrying a heavy stock of raw material. This provision had largely contributed to the success of the undertaking. The complete shell was not made in any one establishment with the exception of the Dominion arsenal at Quebec.

The number of firms engaged in the work of machining and assembling was 130, but others were occupied in the manufacture of blanks, bullets, discs, cartridge cases, buckshot, primers, tubes, tin cups for shrapnel, grub screws, sockets and plugs, steel base plates and boxes, making altogether 247 plants making shells or some of their components. In Montreal, 35 factories were at work, in Toronto 28 and in Hamilton 17. The number of men employed was from 60,000 to 70,000 and the weekly wage bill was about $1,000,000. Since the commencement of the work, orders aggregating 9,000,000 shells had been placed, consisting of 15 and 18-pounder shrapnel, and 18-pounder, 4.5, and 60-pounder high-explosive shells. In addition orders had been given out for 100,000 cartridge cases, 5,000,000 fuses, 2,000,000 primers and 1,000,000 friction tubes. For the contracts already given out, 170,000 tons of steel are required.

Will Make Benzol

And Other Products at Four Plants in Pittsburgh District

The Aetna Chemical Co. is erecting four plants in the Greater Pittsburgh district for the production of a wide range of products, including benzol, toluol, nitric acid, etc. Plants are being built at Carnegie, Oakdale, Noblestown and Pittsburgh, all of which are on the Pennsylvania railroad. At the Carnegie plant, the Aetna company will produce benzol and toluol from crude petroleum under the Rittman process. Benzol will be used in the manufacture of carbolic acid. The Carnegie plant will have a capacity of 25 tons a day. Raw materials used at the Carnegie plant in addition to the crude petroleum will be sulphuric acid, nitric acid, caustic soda, soda ash and lime. By-products will include spent acid, calcium sulphate, calcium carbonate, sodium sulphite, carbon, heavy oils and pitch.

Nitric acid will be manufactured at the Oakdale plant, which will have a capacity of 16 tons a day. The principal by-product of the plant will be salt cake.

Refined chemical products of the benzol will be made at the Noblestown unit, the output of which will include diphenylamine, methyl aniline and napthaline, basic ingredients used in the manufacture of high explosives, as well as aniline oils, etc. The Pittsburgh plant, which is the smallest of the four, will produce products similar to those made at Noblestown.

Another Benzol Plant Awarded

The Otto Coking Co., 6 Church street, New York City, has taken a contract for the erection of a benzol plant in connection with the by-product coke works of the Prospect street plant of the Citizens Gas Co. at Indianapolis. The new plant will have a capacity for treating 1,600 tons of coal daily. The contract provides that the benzol unit shall be in operation in 90 days. The benzol plant of the Republic Iron & Steel Co. at Youngstown, O., which has been built by the Otto Coking Co., has just begun operations. Another plant erected by the company for the Lackawanna Steel Co. at Buffalo, has been operating now for several weeks though no product has been shipped.

The Aluminum Co. of America, Pittsburgh, has awarded contracts for four complete strip mills with rolls, 21 x 36 inches, equipped with Falk drives, to the Lewis Foundry & Machine Co., Pittsburgh. The Lewis company also will furnish one 156-inch squaring shear. Equipment will be installed in a New Kensington, Pa., plant of the Aluminum company.

Permanent Exhibit

The New England Association of Commercial Engineers, an organization which represents practically all of the important agencies dealing in machinery supplies, associated with the use of power and steam, has arranged to have a permanent exhibition of machinery supplies in Boston. The building being erected at the corner of Oliver and Franklin streets, that city, will be occupied by the association. The basement will be fitted up as a lecture room and assembly hall with a seating capacity of 500, and will be equipped with moving picture and stereopticon apparatus. The first and second floors will be devoted to officers, desk rooms and exhibits of sales agencies. The organization, which is under the management of Lewis L. Warren, already has several thousand members and is the only one of its kind in the country. The building will be ready for occupancy during the summer.

When Carnegie Began Steel Making

Encased in an appropriate frame and hanging in a prominent position in the office of the chairman of the United States Steel Corporation at 71 Broadway, New York City, is a blankstock certificate which breathes of the early days of the manufacture of steel rails in this country and of the first ventures in the realm of iron and steel upon which Andrew Carnegie had embarked with considerable hesitancy and trepidation. This certificate was issued by the American Steeled Rail Co., a Pittsburgh corporation organized under the general manufacturing laws of the state of Pennsylvania with a capital stock of $500,000. An old letterhead enclosed in the frame above the certificate gives the officers of the company as: Thomas S. Blair, president; Andrew Carnegie, vice president; Thomas N. Carnegie, treasurer. The date shown on the letterhead is in the 60's.

The "steeled rail" manufactured by the company was in reality an iron and steel section combined. It consisted of an ordinary iron rail over the head of which was slipped completely a jacket of steel and this furnished the wearing service to the wheels. On the desk of Judge Gary reposes a cross section of this rail, which at present performs service as a paperweight.

Best Showing

By Steel Corporation Since Improvement Was Inaugurated

What proves on analysis to be the best showing in new business made during any month since the present movement towards betterment was begun, was set forth in the statement of unfilled tonnage for May announced by the Steel corporation June 10, which marked an increase of 102,354 tons in the total bookings. The total orders on May 31 were 4,264,598 tons against 4,162,244 tons on April 30. The increase in total orders at the month's end was netted in the face of the heaviest operations and shipments in May for more than a year past. Ingot operations in that month averaged better than 75 per cent of capacity. At the present time, they are between 80 and 85 per cent. New business of the Steel Corporation so far in June is understood to have averaged around 40,000 tons daily against a total theoretical capacity of all plants of 46,000 tons daily.

The changes in unfilled tonnage since November, 1912, are given below as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
May 31, 1915	.....	102,354+	2.46+
Apr. 30, 1915	4,162,244	93,505—	2.21—
Mar. 31, 1915	4,255,749	89,622—	2.06—
Feb. 28, 1915	4,345,371	96,800+	2.28+
Jan. 31, 1915	4,248,571	411,928+	10.74+
Dec. 31, 1914	3,836,643	512,051+	15.40+
Nov. 30, 1914	3,324,592	136,505—	3.94—
Oct. 31, 1914	3,461,097	326,570—	8.62—
Sep. 30, 1914	3,787,667	425,664—	10.01—
Aug. 31, 1914	4,213,331	54,742+	1.32+
July 31, 1914	4,158,589	125,732	3.12+
June 30, 1914	4,032,857	34,697+	0.86+
May 31, 1914	3,998,160	278,908—	6.98—
Apr. 30, 1914	4,277,068	376,757—	8.09—
Mar. 31, 1914	4,653,825	372,615—	7.42—
Feb. 28, 1914	5,026,440	412,760+	8.95+
Jan. 31, 1914	4,613,680	331,572+	7.74+
Dec. 31, 1913	4,282,108	114,239—	2.59—
Nov. 30, 1913	4,396,347	117,420—	2.60—
Oct. 31, 1913	4,513,767	490,018—	9.79—
Sep. 30, 1913	5,003,785	219,683—	4.24—
Aug. 31, 1913	5,223,468	175,888—	3.03—
July 31, 1913	5,399,356	407,965—	7.03—
June 30, 1913	5,807,317	517,005—	8.18—
May 31, 1913	6,324,322	654,440—	9.38—
Apr. 30, 1913	6,978,762	490,194—	6.55—
Mar. 31, 1913	7,468,956	187,758—	2.45—
Feb. 28, 1913	7,656,714	170,654—	2.18—
Jan. 31, 1913	7,827,368	104,796—	1.32—
Dec. 31, 1912	7,932,164	79,281+	1.01+
Nov. 30, 1912	7,852,883	258,502+	3.40+
Oct. 31, 1912	7,594,381	1,042,874+	15.33+
Sep. 30, 1912	6,551,507	388,132+	6.29+
Aug. 31, 1912	6,163,375	206,296+	3.46+
July 31, 1912	5,957,079	149,773+	2.58+
June 30, 1912	5,807,346	56,363+	0.98+
May 31, 1912	5,750,983	86,983+	1.52+
Apr. 30, 1912	5,664,885	360,044+	6.97+
Mar. 31, 1912	5,304,841	149,359—	2.79—
Feb. 29, 1912	5,454,200	74,479+	1.38+
Jan. 31, 1912	5,379,721	294,960+	5.71+
Dec. 31, 1911	5,084,761	942,806+	23.24+
Nov. 30, 1911	4,141,955	447,627+	12.06+
Oct. 31, 1911	3,694,328	83,011+	2.25+
Sep. 30, 1911	3,611,317	84,668—	2.34—
Aug. 31, 1911	3,695,985	111,900+	3.33+
July 31, 1911	3,584,085	223,027+	7.16+
June 30, 1911	3,361,058	247,871+	7.96+
May 31, 1911	3,113,187	105,617—	3.28—
Apr. 30, 1911	3,218,704	228,597—	6.63—
Mar. 31, 1911	3,447,301	46,758+	1.37+
Feb. 28, 1911	3,400,543	289,624+	9.31+
Jan. 31, 1911	3,110,919	436,163+	16.30+
Dec. 31, 1910	2,674,757	85,656—	3.09—
Nov. 30, 1910	2,760,413	111,536—	3.88—
Oct. 31, 1910	2,871,949	286,157—	9.12—
Sep. 30, 1910	3,159,106	379,088—	10.74—
Aug. 31, 1910	3,537,128	433,803—	10.92—
July 31, 1910	3,910,931	286,863—	6.72—

Many Men

Needed in Canada and England to Make Munitions

Toronto, June 15.—Geo. N. Barnes, M. P., for Glasgow, Scotland, and W. Windham, of the British board of trade, have arrived at Ottawa, having been commissioned by the British government to engage skilled mechanics in Canada for the manufacture of war munitions. They want, if possible, to secure 30,000 men of the following trades; machinists, including bench hands, lathe hands, millers or mill-wrights, boiler makers and boiler-makers' helpers, riveters, drillers, ship wrights including ship carpenters, sheet-iron workers, coppersmiths, blacksmiths and blacksmiths' helpers. Suitable men, provided they are not employed in Canada at present, will be provided with free transportation to England and set to work immediately on arrival at British trade union rates plus a war bonus. If satisfactory service is given for the period of the war, they will be given free transportation back to Canada. Mr. Barnes has opened an office in the government labor department. It is not thought likely that many men of the class desired can be secured in Canada, as so many large contracts for war munitions are now being filled here.

Arrangements are well under way for the refining under government auspices and probably with government assistance of copper and zinc mined in British Columbia and for the manufacture of brass in Canada. At present, the copper mined in British Columbia is shipped to the United States for refining, paying a heavy freight rate and duty and when reimported must pay further freight charges. It is computed that a refining plant could be established at Trail, B. C., for $1,500,000 and that the cost of refining copper and manufacturing brass, required for shell making purposes would be more than compensated by the saving in the price of the manufactured article.

The Export Association of Canada, Ltd., is being organized with a capital of $500,000 with the object of pushing Canadian trade abroad. It will work in close connection with the Canadian Manufacturers' Association and other producers, and will have the co-operation of the government and the leading railways. It is intended to open an office in London and get in touch with the great distributing and purchasing agencies having headquarters there. Attention will be directed to the French and Belgian markets, which will open up at the close of the war and also the Russian market for manufactured goods of all kinds. The provisional directors include G. H. Duggan, Dominion Bridge Co., Ltd., Montreal; H. L. Frost, Frost Wire Fence Co., Hamilton; R. H. McMaster, Steel Co. of Canada, Ltd., Montreal; W. W. Near, Page-Hersey Iron Tube & Lead Co., Ltd., Toronto, and F. A. W. Wheatley, Canadian Locomotive Co., Ltd., Kingston.

A. S. M. E. at Buffalo

Arrangements have been completed for the spring meeting of the American Society of Mechanical Engineers, which will be held at the Statler hotel, Buffalo, June 22-25. The opening session will be held at 8:30 p. m., Tuesday, July 22, at which time an address of welcome will be made by Frank B. Baird, president of the Buffalo Union Furnace Co., representing the industries of Buffalo, to which Dr. John A. Brashear, president of the society, will respond.

A professional session will be held Wednesday morning in the auditorium of the Shredded Wheat Co.'s factory at Niagara Falls and Wednesday afternoon will be devoted to sightseeing. On Wednesday evening, F. H. Newell, formerly chief of the United States reclamation service, will deliver an illustrated lecture on "The Engineer as a Citizen". On Thursday morning, June 24, simultaneous professional sessions will be held at the Statler hotel, Buffalo, and Thursday afternoon will be devoted to visiting industrial plants.

A reception and dance will be held Thursday evening, and the meeting will be concluded by a final professional session on Friday morning, June 25.

Large Order for Boilers

The Henry Vogt Machine Co., of Louisville, has received the largest contract for boilers in its history, the Standard Oil Co. giving it an order for 20 500-horsepower water-tube boilers, 12 of which will be delivered at Whiting, Ind., and eight at Wood River, Ill. The Standard Oil Co. has given the Vogt company an order for two 200-ton refrigerating machines and nine chilling machines for its Whiting plant. The Louisville Provision Co., which is making improvements in its plant, has given the company an order for a 100-ton refrigerating machine, and the Winter Garden Co., of Pittsburgh, has placed with it an order for a 110-ton refrigerating machine. The Henry Vogt Machine Co. reports that prospects are encouraging.

Check Book

Is Not All That is Necessary to Succeed in Organization

The Industrial Association of Cleveland has elected the following officers: First vice president, J. G. Jennings, president Lamson & Sessions Co.; second vice president, Charles F. Kurz, president Cleveland Store Fixture Co.; treasurer, C. O. Bassett, treasurer Forman-Bassett Co. The governing board will elect the president and secretary.

This organization has been co-operating with similar associations in other Ohio cities and industrial centers in an effort to bring about a federation or unification of employers and manufacturers organizations. C. O. Bartlett, of the C. O. Bartlett & Snow Co., in his address as retiring president of the association, said recently: "The time has arrived when the business man must inject himself into the political situation and in a very practical way. So far there has been much talk along these lines, but very little action. And in doing this, he must be prepared to make some sacrifice. Demands or appeals made upon representatives at state or national capitals carry weight largely in proportion to ability to get votes or shape public opinion." Mr. Bartlett further urged that business men must bring into the work something more than check-book loyalty by giving brains, personality and time.

The association now has 577 members, having gained 179 new members during the last fiscal year. Edward Hobday is counsel and secretary.

Enlargement of Shipyard

Further preliminary steps have been taken toward the extensive enlargement of the shipyard of the Samuel L. Moore & Sons Corporation, Elizabethport, N. J., a subsidiary of the Bethlehem Steel Corporation, plans for which recently were first announced. The city authorities have complied with a request of the company to vacate certain streets in order that the plant extensions may be carried out. The work to be done involves the shipyard formerly owned by the Crescent Shipyard Corporation, which was taken over by the Bethlehem Steel Co. in 1905, and two years later was placed under the control of the Samuel L. Moore & Sons Corporation, a subsidiary. The capacity of this plant is to be so extended that large-sized vessels may be constructed. One statement is that the enlarged plant will employ more than 1,000 men.

News of Employers and Employes

Secession From Amalgamated Association Proves a Fizzle—Chicago Controversy Will be Decided by Arbitration

The attempt of insurgents to gain control of the labor situation in the Wheeling, W. Va., district appears to have met with little or no success. It will be recalled that a new organization was formed in opposition to the Amalgamated Association of Iron, Steel and Tin Workers, when members of that society accepted a reduction in wages in sheet and tin plate divisions at a third referendum. The new body, composed of only a few men, is known as the United Iron and Steel Workers' Association. It is not believed the United Association will make any further headway in the Wheeling district.

Efforts were made several weeks ago by a socialistic element, not connected with the United Association, to organize men in sheet and tin plate plants in the Mahoning and Shenango valleys and in sections of Illinois and Kentucky. The movement met with no encouragement and it is not believed any further attempt will be made at present to carry out proposed plans.

At Wheeling, the Creek mill of the Whitaker-Glessner Co. is operating in full and the plant of the company at Martins Ferry, O., will resume work at an early date. When it was decided to dismantle one of the mills at the Martins Ferry plant, members of the United Association called a "strike", apparently believing they had been discriminated against. The Amalgamated Association opposed the strike and notified mill owners that its members would return to work as soon as their services were desired.

Will Arbitrate

Chicago, June 15.—After several weeks struggling in an effort to get together, arbitration finally has been adopted as a means to settle the strike of carpenters which has been holding up building construction in Chicago since April. Carpenters have chosen James Kirby, of Indianapolis, general president of the United Brotherhood of Carpenters and Jointers of America, and contractors have fixed on Charles W. Gindele, president of the Building Construction Employers' Association. These two have chosen as the neutral arbitrator Joseph E. Lindquist, vice president of the Central Trust Co. of Illinois.

Carpenters are demanding 70 cents an hour for the first year, 72½ cents the second year and 75 cents the third year, while the best offers contractors have made has been an advance of 2½ cents an hour for the last 18 months of a three-year period, which has been refused by a unanimous referendum vote. The scale at present pays 65 cents per hour.

The first effort of the arbitration board will be to bring about an agreement for workmen to return to their jobs at once, their wages to be based on the ultimate decision of the arbitration board.

Republic Won

The first state-wide first aid meet in Alabama was held recently at Birmingham, where 77 teams from practically every industrial corporation in the coal and mining fields of the Birmingham district competed for prizes in first aid work. The meet was held under the auspices of the Alabama Safety Association, the United States bureau of mines, the American Red Cross Society and the Alabama Coal and Metal Mine Operators' Association.

The first grand prize was won by a team representing the Republic Iron & Steel Co.

Would Limit Length of Trains

Chicago, June 15.—Railroads of Illinois are making a determined effort to defeat a bill now before the legislature, the purpose of which is to limit the length of freight trains. Newspaper advertising and other methods are being used to place the railroads' arguments before the people in an effort to have them influence representatives and senators in the legislature.

The bill originally provided a limit of 50 cars and later was amended to provide for a maximum of 75 cars.

The house of representatives has passed the bill, which now goes to the senate. The change from 50 to 75 cars as the maximum resulted from pressure brought to bear by railroad officials, and the claim is made now that the argument for limiting the range of trains has been impeached by increasing the number from 50 to 75.

Railroads claim the only interest behind the bill is organized labor, which seeks to bring about the employment of more train crews by cutting down the number of cars to be hauled in a single train.

Railroads claim equipment valued at $53,000,000 would be rendered useless by this law as much money has been spent in reducing grades, building long side and terminal tracks and in buying powerful locomotives to haul heavy trains. The efficiency of large locomotives now used would be made useless and an increase in the number of trains would require many more locomotives to handle them. These are estimated to cost $20,000,000. Capital to provide this added equipment would result in an interest charge of $1,000,000 per year. The added operating expenses for wages, fuel and other items is estimated at more than $6,000,000.

Railroads estimate that an increase in collisions and casualties at highway crossings may be expected from running more trains and bring forward statistics to show that in other cases when the number of trains has been increased collisions and other accidents have increased in exact proportion.

New Commission

A board known as "the industrial commission" has taken over the administration of the labor department of New York state and succeeds the workmen's compensation commission, in accordance with a bill recently enacted. Governor Whitman has appointed John Mitchell, former president of the United Mine Workers and a former member of the workmen's compensation commission, as chairman of the new commission. The other members are Jas. M. Lynch, present labor commissioner; Wm. H. H. Rogers, president of the Rochester Brick & Tile Co.; Louis Wiard, president of the Wiard Powder Co., Batavia, and Edward P. Lyon, a Brooklyn lawyer. Dr. Thomas Darlington, secretary of the welfare committee of the American Iron and Steel Institute, who was a member of the workmen's compensation commission of New York, has been superseded in office by the appointment of the new commission.

The plant of the Finished Specialty Co., an auxiliary of the Union Drawn Steel Co., Beaver Falls, Pa., has resumed operations. The plant was closed down for practically two years.

Makers Advance Price 10 Per Cent

On Lathes, Screw Machines, Etc.—Increase Expected on All Machine Tools by July 1—Purely Domestic Demand Stronger in East Than West

THE further advances which are being affected in the prices of certain machine tools are of unusual interest at this time. Several of the makers of lathes, automatic and hand screw machines, etc., about a week ago raised their prices an average of 10 per cent. Taking into consideration the advance of 10 per cent made two months or so ago, prices on these machines now are approximately 20 per cent higher than they were at the beginning of the year. Of great interest, also, is the prospect that before the end of June or in the early part of July, prices on practically all other machine tools will be advanced, and it is expected these advances will be about 5 per cent on the average. The makers claim the higher cost of manufacturing machinery at present accounts for these advances. During the past few weeks a great many machine tool manufacturers have materially advanced the wages of their mechanics; these advances in some cases were granted entirely voluntarily, and in others as a result of grumbling on the part of the men. In addition, the manufacturers in the majority of cases are operating their plants overtime and with night shifts, paying more than the usual wages for time extending beyond the regular working hours.

The machinery market is quiet when compared to conditions prevailing over the past few months. This is due, as previously reported, to the fact that machinery of the character most in demand can no longer be obtained on a large scale, except for delivery in the distant future. Were there any number of such machines available for prompt or nearby delivery the indications are that they could be disposed of immediately. Due to the scarcity of machine tools, therefore, the volume of business, both domestic and export, now is not nearly as large as it otherwise would be.

A number of domestic concerns, principally in the west, are figuring on shrapnel or other war material contracts, but the difficulty in obtaining machinery probably will keep a good many of these concerns from entering into the manufacture of these materials. Outside of concerns previously mentioned in *The Iron Trade Review*, the American Steel Foundries is figuring on a good-sized shrapnel contract. The largest recent buyer has been the Crucible Steel Co. of America. This concern, which bought a large number of projectile lathes for a new extension at Harrison, N. J., a short time ago, has closed for an additional large amount of equipment for making high explosive shells; most of the business involved lathes. Domestic business not related to the war except perhaps in a remote way, continues to improve, and this improvement is noted on a larger scale in the east than in the west. The crane market in the east reflects somewhat more activity and there now are more live crane inquiries out in eastern territory than for some time. The Alberger Pump & Condenser Co., Newburgh, N. Y., has bought a 15-ton Niles crane. The Maine Central railroad has bought a 35-ton Northern crane. The Pennsylvania railroad has closed for a 7½-ton crane for its shops at Cape Charles, Va.

Crane Market Active at Pittsburgh

Demand for machine tools continues heavy in the Pittsburgh district. Manufacturing concerns making war materials of miscellaneous types, are buying lathes and a number of industrial concerns are closing for other kinds of machine tools. The Westinghouse Electric & Mfg. Co. and other Westinghouse interests continue to buy heavily. Several attractive inquiries for electric cranes are pending. The Warren City Tank & Boiler Co., Warren, O., has practically closed negotiations for five or six cranes, and the McKeesport Tin Plate Co., McKeesport, Pa., is expected to award contracts for nine cranes at an early date. The General Electric Co. is reported to have closed for one 60-ton and one 15-ton crane for its plant at Erie, Pa. The Valley Forging Co., Verona, Pa., has bought a 5-ton Shaw crane. The Tinken-Detroit Axle Co. has awarded contracts for the erection of a forge shop, 100 x 500 feet. The Reznor Stove Co., Mercer, Pa., and the Erie Stove Co., Erie, Pa., have awarded contracts for extensions to their plants and are expected to buy some new equipment. Deliveries of most types of machinery are deferred and some dealers are unable to promise lathes for anything like nearby shipment.

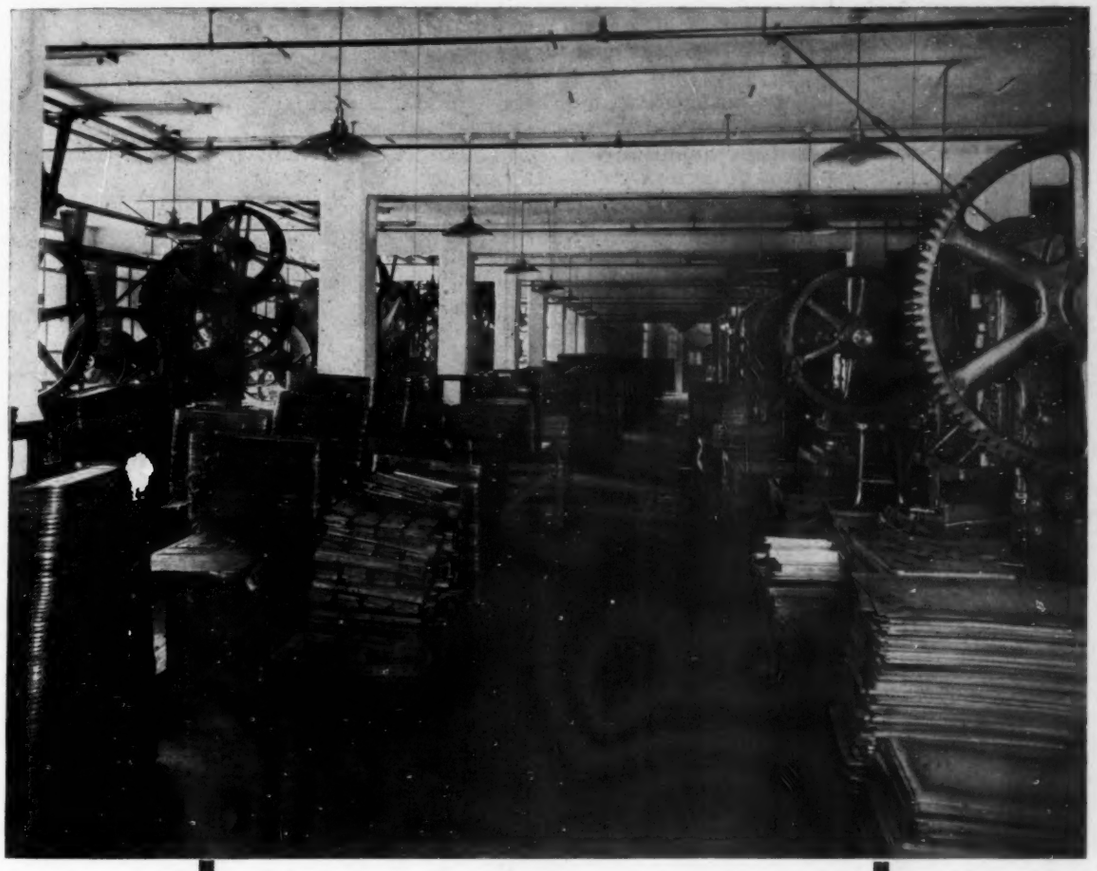
Railroads Still Asleep in Chicago

A seller of machine tools in this territory sums up the situation when he says no trouble is experienced in selling tools, the entire trouble being in obtaining them. Every effort is being made to obtain deliveries from manufacturers, but four to six months are necessary to obtain additional stock. Every second-hand machine which can by any possibility be obtained is being acquired and the only wonder is that the available supply has not been utterly exhausted, so strong has been the demand. The current of trade sets strongly toward the east and into Canada and much of the business being done is under cover, sellers not knowing the destination of their goods. One dealer has just disposed of 50 lathes in one shipment, which are destined for some point in Canada.

General demand from domestic sources is small. Nevertheless, some business is being done in Chicago, although it is based on war demands. The American Car & Foundry Co. has just closed for 51 lathes which it is supposed will be utilized for turning out war munitions. An agricultural implement manufacturer in Chicago has practically closed for about $8,000 worth of tools, including radial drills, lathes and screw machines. Railroad buying still lags, although word is passed that the Santa Fe is about to close and the Burlington is expected to buy within a fortnight. The long expected list from the North-Western has not yet appeared.

Less Direct Foreign Inquiry in Cincinnati

In Cincinnati, a decided slackening in inquiries from Europe is the feature in the machinery market. All shops are filled to capacity for several months ahead on orders from plants in this country which



Ayer & Lord Interior Wood Blocks

in the plant of the CLEVELAND FOUNDRY COMPANY, CLEVELAND, OHIO.

This Company is an extensive manufacturer of Blue Flame Oil Stoves.

Thousands of heavy steel sheets and pieces of shaped steel are stacked all over this plant. Besides this rough treatment the flooring is subjected to very severe trucking, and all the other customary hard shop usages.

All Users Are More Than Satisfied

Here are a few other representative users of AYER & LORD INTERIOR WOOD BLOCKS:

FORD MOTOR CO., BERGER MFG. CO., J.T. RYERSON & CO., YOUNGSTOWN SHEET & TUBE CO., ATLAS DROP FORGE CO., MARK MFG. CO., ILLINOIS CENTRAL R. R. CO., PENNSYLVANIA R. R. CO., CHICAGO & NORTH-WESTERN R. R. CO., THEW AUTOMATIC SHOVEL CO., STANDARD MALLEABLE IRON CO., CHAIN BELT CO., DANVILLE MALLEABLE IRON CO.

Let us send you a complete list of names and addresses of "Ayer & Lord" installations.

Write today for our little booklet, "FLOORS."

Ayer & Lord Tie Company

General Office—Railway Exchange, Chicago

CLEVELAND, OHIO,
926 Illuminating Building
KANSAS CITY, MO.,
1117 Rialto Building
MEMPHIS, TENN.,
1402 Exchange Building
PHILADELPHIA, PA.,
319 Perry Building

Say you saw it in THE IRON TRADE REVIEW

in turn have large orders for munitions of war from European sources, but direct demand from the warring nations for machine tools is less pronounced. This is attributed to the fact that Cincinnati manufacturers are showing a tendency to cater to domestic trade rather than to that from foreign countries, and since ample business can be had from American industries, they have refused many direct orders from Europe. Therefore agents from European nations are not putting their inquiries before the Cincinnati market. Manufacturers are now taking orders very cautiously, and are requiring guarantees that they will not become invalid if the war should suddenly terminate.

EASTERN STATES

RUTLAND, VT.—Rutland Mfg. Co. has been sold by Henry Carpenter, receiver, to William Howard White, Boston, Mass., a large bond holder. The business probably will be continued at the same location.

CHICOPEE, MASS.—Bosch Magneto Co. will build a $70,000, 2-story, brick and steel addition to its plant.

WORCESTER, MASS.—Dean Wire Goods Co. has been incorporated; $15,000 capital stock; by Phillips Vialle, president; Loren T. Baker, treasurer and secretary, and Edward A. Robertson.

ANSONIA, CONN. — Contract has been awarded for a 1-story, 130 x 300-foot casting shop for the Ansonia Brass & Copper Co., a division of the American Brass Co.

BRIDGEPORT, CONN. — Anderson Die Machine Co. has been incorporated; $25,000 capital stock; by Nile H. Anderson, Christian M. Newman and Leonard H. Anderson.

BRIDGEPORT, CONN. — The Remington interests have let a contract for two additional large factory buildings to be erected in Bridgeport.

DERBY, CONN.—General Ordnance Co., recently incorporated in Delaware, has purchased the plant of the United States Rapid Fire Gun & Powder Co. in Derby, and it is understood will manufacture war munitions.

HACKENSACK, N. J.—It is reported in Hackensack that Henry Ford, Detroit, has obtained an option on the old plant of the Pyle Pearline Co. at Shadyside, N. J.

HARTFORD, CONN. — Rowe Calk Co., whose plant recently suffered about $60,000 damage by fire probably will leave the city and is considering sites in Norwich, Conn. The company has been rushed with war orders, but the plant has been closed for a few weeks for overhauling of machinery.

MYSTIC, CONN.—Silex mine property, comprising about 300 acres and a partly worked mine, has been sold by Seeley brothers, New York, to H. G. Mayham, of that city for $100,000. A compressed air plant, new mining machinery and tools will be intalled.

NEW HAVEN, CONN.—Winchester Repeating Arms Co. is taking bids on four more additions.

NEW BRITAIN, CONN.—North & Judd Mfg. Co. is about to let a contract for a 5-story, 52 x 120-foot addition.

NEW HAVEN, CONN. — Alderman Metal Co. has been incorporated; $2,000 capital stock; by Michael Moses, Samuel A. Alderman and Marie Alderman.

WATERBURY, CONN. — Waterbury Tool Co. will erect a one and 2-story, 100 x 200 and 30 x 100-foot, machine shop extension. Engineers Jenks and Ballou, Providence, R. I., are drawing the plans.

PAWTUCKET, R. I. — Phillips Insulated Wire Co. has let contract for a 1-story, 60 x 100-foot machine shop.

PROVIDENCE, R. I.—Gorham Mfg. Co., which recently started work on a large contract for bullet jackets, is expected shortly to begin making 75 centimeter shells.

BROOKLYN.—Iron Clad Mfg. Co., 929 Flushing avenue, is about to start work on its proposed extension.

BUFFALO.—Canadian-American Power Co., Niagara Falls, Ont., the Canadian branch of the Niagara Falls Power Co., Buffalo, will add shortly three 12,500-horsepower units to cost about $1,000,000.

ITHACA, N. Y.—Thomas Brothers Motor Co. has been incorporated to manufacture aeroplanes; $50,000 capital stock; by H. G. Carpenter, O. R. and W. T. Thomas, Ithaca.

LONG ISLAND CITY, N. Y.—Sexauer & Lemke, manufacturers of ornamental iron, have purchased two buildings at the foot of Pierce avenue, and will move there from their old plant on Mill street, Astoria.

NEW YORK. — New York Central and Pennsylvania railroads have put out inquiries in this market for a few machine tools each.

NEW YORK.—Barrett Mfg. Co., 17 Battery place, has let contract for nine large factory buildings, to be erected at Marcus Hook, Pa.

NEW YORK.—Electrolytic Metals Co. has been incorporated; $100,000 capital stock; by M. Hersch, J. J. and H. J. Wile, 2100 Druid Hill avenue, Baltimore, Md.

NEW YORK.—Roller Lock Nut Co. has been incorporated to take over the business of the Wegener Roller Lock Nut Co.; $900,000 capital stock; by H. L. C. Wenk, A. H. Wegener, B. J. Greene, 40 Richards street, Brooklyn.

OSWEGO, N. Y.—Diamond Match Co. has awarded a contract to Peter Raby for the construction of its proposed power house, 80 x 84 feet, four stories.

PORT CHESTER, N. Y.—P. A. Erickson & Son is receiving bids on a 1-story, 40 x 120-foot and a 1-story, 30 x 80-foot machine shop.

PORT CHESTER, N. Y.—New York, Westchester & Boston Railway has been incorporated; $6,000,000 capital stock; by J. Horace Harding, J. T. Pratt, L. S. Miller, 104 East Fortieth street, New York.

POTSDAM, N. Y.—Unity Paper Mills has been incorporated; $100,000 capital stock; by F. L. Cubley, H. Parks, J. F. Obert.

ROME N. Y.—Rome Engineering Co. has been incorporated; $5,000 capital stock; by B. M. Anderson, A. M. and C. R. Brandes.

WATERTOWN.—James B. Wise is considering a 20-foot addition to his power house to house an auxiliary steam plant. Mr. Wise also plans the erection of two additions to his cartridge plant now under construction on a site near his power plant.

WELLSVILLE, N. Y.—Dodge Metal Hose Co., metal hose connections, has been incorporated; $50,000 capital stock; by E. C. Brown, P. B. Hanks, and H. W. Breckenbridge, Wellsville.

BEAVER FALLS, PA.—The city plans to build a new sewage disposal plant; Leo Hudson, engineer, House building, Pittsburgh, has plans.

BELLEFONTE, PA.—Alpha Metals Co. has been incorporated; $25,000 capital stock; by F. E. Naginey, J. P. Harbold and W. P. Sieg.

BROOKVILLE, PA.—Brooksville Electric Co. has been incorporated to furnish heat, light and power; $5,000 capital stock; by G. W. Herrick, J. P. Duffield and E. J. Britsch.

ELLWOOD CITY, PA.—Shelby Tube Co. has completed plans for the erection of several additional mills and furnaces to its plant, the total cost of extensions and improvements to be about $1,000,000.

ERIE, PA.—Erie Forge Co., Fifteenth and Cascade streets, has let a contract for an addition.

ERIE, PA.—Erie Stove Co.'s extension to its plant, involving 200 tons, will be erected by the Pittsburgh Bridge & Iron Co., Pittsburgh.

MERCER, PA. — Reznor Stove Co. has awarded a contract to the Pittsburgh-Des Moines Bridge Co., Pittsburgh for several new buildings involving 400 tons.

NEWCASTLE, PA.—American Car & Ship Hardware Co. will go ahead at once on the erection of permanent building additions, the city having voted to vacate the blind end of Mechanics street, which has been occupied by temporary buildings of the company for three years.

PHILADELPHIA.—Wiscaco Screw & Machine Works, has been incorporated; $100,000 capital stock; by Charles W. Lawson, Neilson Sharp, Arthur K. Hutchinson and Joseph D. McCoy.

PITTSBURGH.—Contracts will be awarded about July 1 for the erection of the South Hills Bailey high school, to cost $850,000.

PITTSBURGH. — George Hagan, Peoples Bank building, wants to communicate with concerns interested in the manufacture of shrapnel and shells.

PITTSBURGH.—Carbo Hydrogen Co. of America, Pittsburgh, has been incorporated with a capital of $3,500,000 by J. R. Rose, Pittsburgh; Norman X. Coffin, Herbert E. Latter, Wilmington, Del.; Clement M. Enger, Elkton, Md. The company will manufacture hydro carbon and similar other gases, also blow pipes for cutting and welding purposes.

ELIZABETHPORT, N. J. — Samuel L. Moore & Sons Corporation, a subsidiary of the Bethlehem Steel Corporation with plant in Elizabethport, has asked the board of works for permission to close several streets near its plant. It is rumored the company is about to engage in the construction of large naval vessels, but it is considered likely that the company will construct nothing larger than merchant vessels. Among the improvements contemplated, are the erection of several new piers, and a new foundry, and the renovation of the entire plant.

HARRISON, N. J.—Crucible Steel Co. of America, recently reported as having purchased a large number of projectile lathes and a large number of cranes for the immense extension it is erecting in Harrison, again has entered the market and has closed for a great quantity of equipment of all kinds, principally lathes, to be used in making high explosive shells. The company is understood still to be in the market.

NEWARK, N. J.—Hohl Wrapping Machine Co., manufacturer, has been incorporated; $750,000 capital stock; by Herman Bauer, Robert R. Graham and Melvin Stephens.

NEWARK, N. J. — Nicholsbury Brothers Co. has taken out a permit for the erection of two frame factory buildings, one and 2-stories, on Meadow street.

NEWARK, N. J.—Engineering Construction Co. has been incorporated, $10,000 capital stock; by James Lieb, Max L. Bernstein and E. D. Lasher.

NEWARK, N. J.—Beaver Electric Lamp Co., manufacturer, has been incorporated; $100,000 capital stock; by Edmund Beatty,

The Meaning and Power of Words

Men of talent are plentiful. You cannot walk a block on Broadway or Michigan Avenue without knocking elbows with men of talent. Every college turns them out. They are found in golf clubs, in politics, in the church, in literature, in commerce and on the stage. The world has always been rich in talent; but men of genius are far apart. You could walk a thousand miles up and down Broadway or Michigan Avenue and not meet a man of genius.

Joseph Conrad Korzeniowski

is a man of genius.

> "Don't talk to me of your Archimedes' lever," said Conrad. "Give me the right word and the right accent and I will move the world. He who wants to persuade should put his trust in the right word. The power of sound has always been greater than the power of sense. Nothing humanely great, as affecting a whole mass of lives, has come from reflection. On the other hand you cannot fail to see the power of mere words; such words as glory, for instance, or pity. Shouted with perseverance, with ardor, with conviction, these two by their sound alone have set whole nations in motion and upheaved the dry, hard ground on which rests our whole social fabric. Archimedes was an absent minded person with a mathematical imagination. Mathematics command my respect, but I have no use for engines. Give me the right word and the right accent and I will move the world. Those who read me know my conviction that the world, the temporal world, rests on a few very simple ideas; so simple that they must be as old as the hills. It rests notably among others on the idea of Fidelity."

The meaning and power of words is indeed an illuminating study. The Century Dictionary gives the meaning of the word "Firth" to be

Security
Protection
Peace

and the word "Sterling" is defined as

Genuine
True
Pure

Today in our schools, where spelling is no longer taught, how many students would know that F-I-R-T-H spells protection? and that S-T-E-R-L-I-N-G spells true? Would even their teachers know this?

Joseph Conrad is sound in his philosophy of the right word. The spiritual is not all of life, but try leaving it out of our words and we have only the shell and ashes left.

The word **Home** becomes **House.**
The word **Liberty** becomes **License.**
The word **Mother** becomes **Parent.**
The word **Appreciation** becomes **Applause.**
The word **Sin** becomes **Offense.**
The word **Forgiveness** becomes **Pardon.**

But certainly there is the material as well as the spiritual. Man must use not only words but tools. Civilization would be as incomplete without Tools as without Faith. The right word is needed and the right tool is needed. Thomas Carlyle's definition of a man will forever be as true as Joseph Conrad's definition of a word:

> "Nevertheless he can use tools, can devise tools. With these, the granite mountain melts into light dust before him. He kneads glowing iron as if it were soft paste. Seas are his smooth highway, winds and fire his unwearying steeds.
> "Nowhere do you find him without tools. Without tools he is nothing, with tools he is all."

FIRTH-STERLING STEEL COMPANY McKEESPORT, PA.

Newark; Frederick Rosseter, Irvington; Philip Dreyfuss, Rutherford.

PATERSON, N. J.—Hermas Machine Co. has been incorporated to manufacture mill supplies, etc.; $50,000 capital stock; by Arthur C. Mason, Paterson; George H. Mason, Wheeling, W. Va.; Edward H. Hergesheimer, Paterson.

PERTH AMBOY, N. J.—The board of trade will erect a $20,000 factory building. Ira R. Crouse is contractor.

PLAINFIELD, N. J.—International Motor Co. will enlarge its Saurer plant here by building a 1-story, 120 x 120-foot machine shop and a 1-story, 40 x 60-foot power house. The engineer, John G. Brown, Witherspoon building, Philadelphia, shortly will receive bids.

TRENTON, N. J.—A contract will be let soon for the erection of a $650,000 hotel on the site of the Trenton House.

TRENTON, N. J.—North American Fuel Co. will build a $20,000 plant on Brunswick avenue.

TRENTON, N. J.—Jordan I. Mott Co. is adding 19 new furnaces to its foundry and building a 500-foot railroad spur to run the proposed new building where war munitions will be made.

WILMINGTON, DEL.—Standard Arms Co. will erect a $7,000, 54 x 63-foot, 1-story factory addition of terra cotta construction.

HAGERSTOWN, MD. — Plans have been completed by Architects Peuckert & Wunder, Philadelphia, for a one and 2-story addition, 100 x 190 feet, to be erected at Hagerstown for the Pangborn Corporation.

WASHINGTON. — An American consular officer in Greece reports a firm in his district may be induced to purchase iron beams or girders, sheet iron, zinc in sheets, wire nails, iron pipes, etc. A consul in Italy announces an American firm contemplates erecting a marble plant in his district and wishes to get in touch with American manufacturers of marble machinery and power equipment. Address the bureau of foreign and domestic commerce for further information.

CENTRAL STATES

AKRON, O.—Mechanics Mold & Machine Co., recently organized, will erect soon a $12,000, 1-story, 76 x 90-foot machine shop on East Cosier street.

BELLEFONTAINE, O.—Engineers of the Big Four railroad plan the erection of a viaduct on the Carlisle road, in conjunction with the county commissioners.

BELLEVUE, O.—Fostoria Light Car Co. is being organized with a capital stock of $100,000 and will go into operation in the old glass plant.

CINCINNATI.—Ryan Soap Co. will erect a warehouse, 32 x 40 feet; steel sheet metal will be used for siding and roof, with steel supports.

CINCINNATI.—Albert Reinhardt, clerk of county commissioners, will open bids July 2 for checkered steel plates for the Beachmont avenue bridge, Anderson township; certified check for $500 required.

CINCINNATI.—It is reported the American Locomotive Co. is planning to establish a branch plant in Cincinnati for the filling of war orders. It is said if a suitable plant cannot be rented one will be erected.

CINCINNATI. — Kincaid Stoker Co. has been incorporated at $50,000 to manufacture a mechanical stoker for use on boats, ships and locomotives, and in power plants. John Kincaid, Napoleon DuBrul, D. S. DuBrul, and Clarence DuBrul, are the incorporators.

CINCINNATI.—The 148 x 278-foot plant of the Eureka Foundry Co. at Richmond and Court streets, has been purchased by the Bickett Machine Co., and will be remodeled and occupied at once. The Bickett Machine Co. manufactures special machinery, including equipment for making tobacco bags, envelopes, etc.

CLEVELAND.—Cleveland Motorcycle Mfg. Co. has been incorporated; $100,000 capital stock; by M. P. Mooney, I. M. Faulhaber, J. L. Bushea, F. G. Mooney and M. J. Mahon.

CLEVELAND.—Cleveland Welding & Mfg. Co. has awarded the Hunkin-Conkey Construction Co. the general contract for its $26,000 factory addition at West 117th street.

CLEVELAND.—Cleveland Modern Foundry Co. has been incorporated; $5,000 capital stock; by F. W. Zimmerman, M. J. McCarthy, H. E. McCormick, J. P. O'Donnell and I. J. Holmes.

CLEVELAND.—National Engineering Co. of Cleveland and 1943 Amsterdam avenue, New York, has a $20,000,000 contract for a 300-mile railroad in Ontario, including also the construction of telephone lines, depots, water tanks, freight sheds, repair shops and a plant to develop 80,000 horsepower by use of water.

CLEVELAND. — Schwarzenburg & Gaede, engineers, will receive bids about June 21 for the erection of a $200,000, 4-story, 200 x 322-foot, brick and steel factory building on East Fifty-fifth street, near Superior avenue, for Richman Brothers Co., clothers. C. L. Richman is president.

CLEVELAND.—F. B. Stearns Co., manufacturer of automobiles, has broken grounds for the immediate erection of a $100,000, 5-story, concrete building at Euclid avenue and the Nickel Plate railroad. This extension had been planned for the near future, but it is stated the big increase in business has demanded immediate action.

COSHOCTON, O.—Coshocton Construction Co. has been incorporated; $15,000 capital stock; by George J. Bock Jr., Robert C. Blackledge, Charles T. Lightell, G. B. Akeroyd, Bertha M. Bock.

DAYTON, O.—Pierce D. Schenck, formerly president of the Dayton Malleable Iron Co., has purchased the plant of the Dayton Foundry Co., which he will operate.

FREMONT, O. — Sandusky River Power Co. has changed its name to the Ohio State Power Co., and has increased its capital stock from $900,000 to $1,000,000.

GALION, O. — Commissioners have sold $28,000 bonds for the construction of three bridges over the Sandusky river, one in Dallas township, another in Liberty township, and the third or an extension of the Mary street bridge in Bucyrus, O.

LORAIN, O. — Standard Oil Co. and the Lake Erie Oil Co. are said to be contemplating additions to their plants in Lorain if the inflammable liquid bill before the city council is modified.

NILES, O.—Dollar Savings Bank Co. plan to build a $100,000, 1-story brick building.

PAINESVILLE, O. — Detroit capitalists have purchased the plant of the Vulcan Car Co., and will manufacture motor trucks in addition to the regular line Vulcan cars.

SIDNEY, O. — Sidney Tool Works Co., which recently received a large order for milling machines, will add to its equipment.

VAN WERT, O.—Northwestern Ohio Light Co., recently organized at $10,000, will operate 17 light plants and will issue $100,000 bonds to cover improvements.

WELLSVILLE, O.—This city authorized the sale of $60,000 bonds for the erection of a municipal light plant.

YOUNGSTOWN, O.—Mahoning Contracting Co. has been incorporated; $10,000 capital stock; by J. E. Jones, William James, R. L. Davis, J. W. Blackburn and T. Harrington.

YOUNGSTOWN, O.—Youngstown Sheet & Tube Co. has prepared its own plans for the coal handling plant and coke docks for its new by-product plant and will take bids and superintend the work itself.

BERKLEY, W. VA.—Raleigh Tile & Brick Co., capitalized at $75,000, has taken over additional property and will install an $18,000 brick plant. A. D. Preston, Berkley, heads the company.

HUNTINGTON, W. VA.—J. S. Larkin, president of the state board of control, will receive bids until June 29, for a new science hall at Marshall college; also at that date for an addition to the mechanical hall and a building for the school of medicine at the West Virginia University.

MOUNDSVILLE, W. VA. — Mound City Coal Co., capitalized at $300,000, Reynolds Ailes, Pittsburgh, president, is negotiating for the purchase of the Mound City mine of the Mound Coal Co. and 900 acres of land adjoining, and contemplates improvements increasing the daily capacity from 600 to 900 tons.

PARKERSBURG, W. VA.—It is reported a party of men from East Liverpool, O., and Columbus, O., is considering the erection of a manufacturing plant in Parkersburg.

PARKERSBURG, W. VA.—Work is going forward on the power plant of the Kanawha Traction & Electric Co., 90 x 140 feet, extending 30 feet below and 25 feet above the ground level.

WHEELING, W. VA.—The board of education will build a $100,000 fireproof school; Frank Stanton, clerk of board.

WHEELING, W. VA.—Fred Faris, architect, is preparing plans for a $150,000, 4-story Scottish Rite cathedral.

WILLIAMSON, W. VA.—A. C. Pinson, mayor, will open bids June 26 for the construction of a bridge across the Tug river; certified check of 2 per cent of bid required.

CARLISLE, KY.—Machine tools will be needed by the Carlisle Garage Co. Robert Harper is manager.

LEXINGTON, KY. — Twentieth Century Metallic Packing Co. will have its patented piston rings manufactured by contract for the present, instead of building a factory. Thomas G. Saxton is president.

LOUISVILLE, KY.—D. X. Murphy & Brother are drawing plans for a $200,000 addition to the Tyler Hotel, Louisville.

LOUISVILLE, KY.—O'Donnell Coal Co. will purchase electric power and special equipment for a sand and gravel elevator.

LOUISVILLE, KY.—West Engineering Co. recently organized with $5,000 capital stock, will deal in power plant equipment and will install power plants and fuel devices. W. M. West, is manager.

MORTON'S GAP, KY.—Morton's Gap Ice & Light Co. has been incorporated; $10,000 capital stock; by W. W. Kington, Katherine Oates and others.

SHARPSBURG, KY.—Sharpsburg Electric Light Co. will build a plant and install an electric lighting system.

WADDY, KY. — Power and special equipment will be needed by J. S. Choak, Waddy, Ky. who will build a $10,000 flour mill.

EVANSVILLE, IND.—Evansville business association has information regarding the location of a chemical company now operated in New Jersey.

EVANSVILLE, IND.—Leon Lett, colored, has patented a turbine gas engine which will be manufactured by a company now being incorporated; Arthur H. Meyer is his attorney.

GOSHEN, IND.—Goshen Sheet Metal Specialty Co. is erecting a 40 x 150-foot addition to its plant.

INDIANAPOLIS.—Prest-O-Lite Co. has taken over the business and plant of the Pumpelly Battery Co. makers of storage batteries, ignition and lighting systems and will develop this part of the business.

LA FAYETTE, IND. — Motsinger Device

Co., manufacturer of carburetors, has increased its capital stock from $150,000 to $300,000 and will enlarge its plant.

LIGONIER, IND.—Banta & Bender Refrigerator Co. is to rebuild its burned plant at a cost of $45,000.

MARTINSVILLE, IND.—Special Machinery & Foundry Co., Indianapolis, has contracted with the Martinsville Factory club to build a factory and heating plant at Martinsville.

ALTON, ILL.—Duncan Foundry & Machine Works is erecting a new plant with twice the capacity of the former shop.

CEDARVILLE, ILL. — Cedarville Park Power & Light Co. has been incorporated; $5,000 capital stock; by Wm. M. Clingman, John Bollman and Smith C. Thompson.

CHICAGO.—Automatic Recording Safe Co., 159 North State street, has increased its capital stock from $150,000 to $200,000.

CHICAGO.—Art Metal Products Co., 514 South Green street, has increased its capital stock from $20,000 to $50,000.

CHICAGO. — American Steel Foundries is figuring on a good-sized shrapnel contract and has inquiries out for equipment for making material.

CHICAGO.—Universal Safety Lock Co. has been incorporated to manufacture locks; $100,000 capital stock; by H. L. Mason, John N. Lucas and Wm. N. Mitchell.

CHICAGO.—Kedzie Foundry Co. has been incorporated; $15,000 capital stock; by G. E. Erlandson, George R. Harbough and John E. Erickson, Thirty-first and Kenzie streets.

CHICAGO.—National Faucet Co. has been incorporated to manufacture plumbing supplies, $1,000 capital stock; by Benjamin E. Cole, Richard F. Poulton and William E. Rodriquez, 105 North Clark street.

CHICAGO.—Universal Portable Engine Co. has been incorporated to manufacture engines; $10,000 capital stock; by John F. Evans, Leroy Hackett and Leo. J. Doyle, 209 South La Salle street.

CHICAGO.—Bids will be received until June 30 by W. R. Moorhouse, commissioner of public works, 406 City Hall, for pumping machinery and auxiliaries for the Sixty-eighth street pumping station.

CHICAGO.—Revised bids will be asked on a 3-story manufacturing building, 50 x 135 feet, for Hanson & Van Winkle Co., 180 North Clinton street, by Huehl Schmidt & Holmes, 154 West Randolph street.

CHICAGO.—Wheelock & Shank, architects, 64 West Randolph street, are making plans for a hotel, 16 stories, 175 x 300 feet, for a syndicate represented by J. M. Gartside, 105 South LaSalle street, Chicago.

KEWANEE, ILL.—Wray Fresh Water Supply Co. has taken over the machine shop equipment, etc. of Hedburg Brothers and the Kewanee Brass Foundry Co. has bought their foundry. A new brass furnace is to be put in service.

McLEAN, ILL.—Board of local improvements, John Stubblefield, mayor, is planning additions to the water works plant, including pumping station, steel storage tank of 20,000 gallon capacity and mains.

PEORIA, ILL.—Consolidated Bank, William C. White, president, is having plans prepared for a $100,000, 4-story bank building.

PEORIA, ILL.—Dooley Brothers have bought the Wantling factory and it will be removed to East Peoria and equipped for manufacturing mining drills, picks and other mining equipment.

CHEBOYGAN, MICH. — Cheboygan Electric Light & Power Co. plans to erect a power plant on the Black river, moving the present plant from the middle of the river to the shore. F. B. Spencer and Mr. Rogan, Chicago, are expected to take charge of the work, which is estimated to cost $75,000.

DETROIT.—Metropolitan Motor Co. is to build a garage, 70 x 170 feet, on Woodward avenue.

DETROIT.—John Lauer Machine Co., the Monarch Mfg. Co., and the Detroit Pattern Works were among those damaged by fire recently; loss about $10,000.

DETROIT.—Timken-Detroit Axle Co. which will erect a forge shop, 100 x 500 feet, will be furnished with steel by McClintic-Marshall Co., Pittsburgh.

GRAND RAPIDS, MICH.—Bids now are being opened for the 50 x 50-foot power house to be erected for the Imperial Furniture Co.

JACKSON, MICH.—Jackson Cushion Spring Co. is about to build an addition at a cost of $25,000.

JACKSON, MICH. — Central State Bank, care Mr. Bullard, is having plans prepared for a bank building, eight stories. E. E. Bailey Co., Chambers building, Oil City, Pa., is engineer. Bids will be taken soon.

KALAMAZOO, MICH.—Mr. Lane, representing Kalamazoo business men, has made a proposition to the Acme Chair Co., Reading, Mich., for the removal of the plant to Kalamazoo. Mr. Schermerhorn of the Acme Chair Co. said the proposition will be considered.

LOWELL, MICH.—Hydro Electric Co. has engaged Wernette - Branfield - Mead, Grand Rapids, Mich., to prepare plans or a number of changes and improvements to the plant.

MILFORD, MICH.—Detroit Auto Dash Co. which is to build a factory, 44 x 202 feet, a boiler room, 24 x 30 feet and a dry kiln, 20 x 70 feet, will need entirely new equipment and machinery.

MT. PLEASANT, MICH.—Mount Pleasant Michigan Motor Co. is making plans for an addition to its plant.

MUSKEGON, MICH.—Bradley & Aukebrandt Co. recently incorporated at $15,000 to manufacture plumbing and steam fitters supplies will erect a factory. Address James Bradley.

MUSKEGON, MICH.—Muskegon, Casnovia & Saginaw Interurban Railway Co. has completed surveys for its line from Crystall Falls to Muskegon, about 80 miles. G. S. Gamble, Muskegon, is engineer.

PONTIAC, MICH.—The city and the Grand Trunk railroad officials have agreed to build two overhead bridges, one at Lawrence and Pike streets and the other at Orchard and Lake avenues. These brigdes are to be completed within three years.

PONTIAC, MICH.—American Forging & Socket Co., recently incorporated at $100,000 has purchased the plant of the Michigan Oak Flooring Co., Wesson street, and is building an addition which will give it 16,000 square feet of floor space. The company will start operations in about a mouth manufacturing a patent socket for automobiles, employing about 25 men.

PORT HURON, MICH. — Independent Motors Co. has increased its capittal stock from $60,000 to $120,000.

SAGINAW, MICH.—A referendum will be called soon on a question of appropriating $700,000 for a pumping station and water works. Herman R. Eymer is city engineer.

SOUTH LYONS, MICH. — Roseback & McKee, Fort Wayne, Ind., engineers, have been commissioned to superintend construction of a municipal water works at South Lyons.

CLINTONVILLE, WIS.—South Side Machine Works is to rebuild its burned plant at a cost of $15,000.

EAU CLAIRE, WIS.—Steel Inner Case Co. has been incorporated with a capital stock of $5,000 by T. W. Black, Thomas E. Wylie and Henry G. Neher.

EAU CLAIRE, WIS.—Drummond Packing Co. has awarded the general contract to the Wisconsin Construction Co., Chippewa Falls, Wis., for a fertilizer building, tank house and cooler. The structures will be of reinforced concrete, two, three and four stories, 83 x 230 feet.

JANESVILLE.—Janesville-Madison Railroad Co. has taken steps toward floating a $1,344,000 bond issue for the construction of its electric railway from Janesville to Madison. Work on the line has been started from the Madison end.

MADISON, WIS.—E. E. Dillon, architect and engineer, Madison, is completing plans

As Mr. Dooley Says: SOME Tiptations

There's an old French proverb:

When tempted, yield at once and avoid the struggle.

So—

Mr. Sales Manager

When looking over this column EACH WEEK

and

Being "allured" by a few "live ones"—

real tips,

"FALL"

and

Avoid the struggle for new business.

New York Central and the Pennsylvania railroads are in the market for a few machine tools each.

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Samuel L. Morris & Sons Corporation, Elizabethport, N. J., contemplates improvements, including the erection of a new foundry and the renovation of the entire plant.

Ammons Automatic Fire Alarm System, Houston, Tex., J. B. Ammons, general manager, is inquiring for brass foundry equipment.

Arizona Power Co., Prescott, Ariz., will issue $340,000 in bonds for extensive improvements to its power plant.

Shelby Tube Co., Ellwood City, Pa., has completed plans for the erection of several additional mills and furnaces to its plant, the total cost of extensions and improvements to cost about $1,000,000.

F. B. Stearns Co., Cleveland, manufacturer of automobiles, immediately will erect a $100,000 five-story concrete addition to its plant.

for a municipal electric light plant, village hall and jail at Westby, Wis., to cost in all about $30,000.

KENOSHA, WIS.—H. H. Hahn is preparing plans for the erection of a $100,000 high school in Kenosha, contatining a complete manual training department.

MARSHFIELD, WIS.—Felkner Bros. Mfg. Co. has completed plans and will start work at once on its proposed factory addition. The company soon will take up the manufacture of barn equipment.

MILWAUKEE. — Plans have been completed by Kirchoff & Rose, architects, Milwaukee, for a 4-story, steel and brick office building, 150 x 200 feet, costing $400,000.

MILWAUKEE.—M. A. Tulgren & Son are preparing plans for the erection of a $170,000 apartment building at Astor and Martin streets.

MILWAUKEE.—Federal Pressed Steel Co., it is reported, has received an order for $1,800,000 worth of cartridge parts for shrapnel shells. This company has erected one building, 100 x 240 feet, and may erect another.

MILWAUKEE.—Plans for the erection of a bridge over the Milwaukee river at State street were discussed at a recent hearing at the office of Major H. P. Ferguson, chief of the corps of the United States engineers; arguments will be forwarded to the secretary of the War department.

RACINE, WIS.—Edward B. Funston & Co. are preparing plans for the erection of a $30,000, 3-story, 50 x 250-foot, brick and steel addition to the plant of the Hamilton-Beach Mfg. Co., manufacturer of electrical devices and appliances.

SHAWANO, WIS.—Plans are in progress for a $40,000 power house for the city water and electric light plant. Power Engineering Co., Minneapolis, is engineer.

WABENO, WIS. — Wabeno Lighting Co. has been incorporated; $5,000 capital stock; by G. W. Jones, H. C. Humphrey and R. H. Jones.

WEST ALLIS, WIS.—North End Foundry Co., Sixtieth avenue, is planning an addition to its foundry to be erected next fall.

WESTBY.—E. E. Dillon, architect and engineer, 1039 University avenue, Madison, Wis., is completing plans for the erection of a municipal electric light plant, village hall and jail in Westby, which will represent an investment of about $30,000.

KANSAS CITY, MO.—Bonds for $300,000 have been voted for a garbage disposal plant. Address city clerk.

KANSAS CITY, MO. — L. M. Gilday, county clerk, will call for bids shortly on a reinforced concrete viaduct, 454 feet long, with 30-foot roadway.

KANSAS CITY, MO.—J. A. McBride Mechanical Equipment Co. has been incorporated $16,000 capital stock; by J. A. McBride, E. V. Sullivan and C. G. Van Horn.

KANSAS CITY, MO.—Bids have been rejected on a motor driven centrifugal pump which the city desires to buy for the Turkey creek pumping station.

KANSAS CITY, MO.—St. Joseph Hospital power plant plans include an engine, generator and 30-ton ice plant. Henrici, Kent & Laurie, 715 Reserve Bank building, Kansas City, are engineers.

KANSAS CITY, MO.—Bolton Investment Co., care J. Stats, 304 Dwight building, is taking bids through its architect, J. H. Hartling, 15 West Ninth street, on a 9-story hotel, 25 x 142 feet costing $100,000.

ST. JOSEPH, MO.—Buchanan Elevator Co. has been incorporated; $250,000 capital stock; by R. T. Forbes, J. G. Schneider and John E. Doleman.

ST. LOUIS.—Linde Air Products Co., 30 East Forty-second street, New York, is taking bids on a 1-story, 65 x 144-foot plant to be erected in St. Louis.

ST. LOUIS.—Missouri Pacific railroad has submitted plans for approval to the board of public service, W. T. Findly, secretary, 315 City Hall, for a reinforced concrete viaduct, 1680 feet long and 80 feet wide.

ST. LOUIS.—Bids will be received until June 26 by the board of public service, Wm. T. Findly, secretary, 315 City Hall, for furnishing, fabricating and delivering steel for the eighth section of the municipal bridge over the Mississippi river.

ST. LOUIS.—Birge-Brown Mfg. Co. has been incorporated; $10,000 capital stock; by Arthur B. Birge, president, E. M. Birge, vice president, and Walter Brown, secretary and manager. The company will make Quicset hand hole cover plates or boilers.

DES MOINES, IA.—Plans have been completed for a central heat and light plant, costing $300,000, for the Continental Gas & Electric Corporation; C. S. Eaton, president, New York. W. H. Abbott, 401 Manhattan building, Des Moines, is engineer.

TERRELL, IA.—Bonds for $85,000 have been voted for a water works plant.

MINNEAPOLIS.—Bids have been rejected and new tenders will be asked on a 12-story hotel, 88 x 157 feet, to cost $200,000, for the Union City Mission, C. E. Bell, 310 Security Bank building, is architect.

MINNEAPOLIS. — Metropolitan National bank, Metropolitan Life building, has plans for a $300,000 office building at Sixth street and Second avenue. V. H. Van Slyke is president.

MOORHEAD, MINN. — E. O. Burch, engineer, 722 Plymouth building, Minneapolis, is preparing plans for a $22,000 water works at Moorhead.

OWATONNA, MINN.—State Board of Control, Downer Mullen, secretary, St. Paul, has plans for a power house, two stories, 50 x 80 feet, to cost $25,000. C. L. Pillsbury, 805 Metropolitatn Life building, Minneapolis, is engineer.

ST. PAUL. — Maendler Brothers, 42 East Third street, are building a four-story factory, 150 x 208 feet. P. Maendler is president.

SOUTHERN STATES

BIRMINGHAM, ALA.—Birmingham Stove & Range Co. is to rebuild its burned plant at a cost of about $50,000.

COLUMBUS, TEX.—Colorado county and Austin county commissioners are to construct a single span bridge, 130 feet, across the San Bernard river, at a cost of $3,000.

GORDON, TEX.—Gordon-Mingus Light Co. has been organized with a capital stock of $6,000 to erect an electric light plant in Gordon.

HOUSTON, TEX.—Texas & Pacific railroad, C. G. Chamberlain, chief engineer, Dallas, is to construct a steel bridge over the Trinity river.

HOUSTON, TEX. — Ammons Automatic Fire Alarm System, J. B. Ammons, general manager, Union National Bank building, is inquiring for brass foundry equipment.

PALESTINE, TEX.—Texas Power & Light Co., E. B. Neiswanger, construction engineer, Dallas, is to erect a power station at Palestine, including a Deisel engine, steam turbine and reciprocating engine for developing 1,200 kilowatts, with space reserved in the power house for an additional 500 horsepower.

TIMPSON, TEX.—Henry E. Elred, engineer, Dallas, is preparing plans for a water works system at Timpson.

BRISTOL, TENN.—The plant of the Iron City Foundry & Stove Co., recently purchased by J. Gutman, is to be enlarged and improved.

BRISTOL, TENN.—Standard Oil Co. will erect a large distribution plant in Bristol, requiring tanks, etc. Lewis Nailing, Memphis, has charge of the construction.

CENTREVILLE, TENN.—J. O. Griffiths and Ira J Hoover are purchasing equipment for a large phosphate works to be established near Centreville.

CLARKSVILLE, TENN.—The plant of the Kentucky Public Service Co., general offices at Bowling Green, Ky., will be improved, according to H. D. Fitch, general manager.

FRIENDSHIP, TENN.—A bond issue is planned for the establishment of an electric light plant.

HENDERSON, TENN. — City will spend $57,000 for the erection of a water works and electric light plant; address mayor.

KNOXVILLE, TENN — Littlefield - Steere Co. has announced plans for erecting a $30,000 factory building, 87 x 100 feet.

KNOXVILLE, TENN.—Fulton Co., manufacturing heat regulators, has begun work on the erection of an additional shop.

LEXINGTON, TENN.—Jones Strainer Mfg. Co. will erect a factory for the manufacture of well strainers and other cistern specialties. Eli Jones and others are interested.

MARYVILLE, TENN.—Tennessee Power Co. has filed a mortgage here for $50,000,000. and is believed to be planning other large water power developments in Western Tennessee.

MEMPHIS, TENN.—Mayor Crump has taken up the project of building or buying an electric light plant with the proceeds of a $1,500,000 bond issue.

NASHVILLE, TENN.—Groat Knitting Mill will remove its plant employing 1,000 persons, from Scranton, Pa.

KINGSTON, OKLA.—Geo. F. Blether, recently given a franchise for an electric light plant, is to install a 37½ kilowatt ampere alternator and a 50-horsepower oil engine.

TULSA.—Tulsa Stove & Foundry Co. has been incorporated; $60,000 capital stock; by C. C. Spitznagle, H. E. Barlett, W. E. Rhode and George Kennedy.

TYRONE, OKLA. — Tyrone Light, Ice & Power Co. has been given a franchise for a light and power plant at Tyrone. Walter I. Harvith is interested.

WESTERN STATES

ANAMOOSA, N. D.—Plans are being prepared for a $10,000 water works system. E. C. Wyndham is city clerk.

LINCOLN, NEB. — Martz Engineering Co., 416 First National Bank building, is making plans for a power and light plant at the state penitentiary to cost $40,000.

HOLTON, KAN.—Bids will be received until June 25 by W. H. Webster, county clerk, for a 50-foot and a 60-foot, steel bridge and a 70-foot, steel bridge with steel piling, all 14 feet wide.

BOSEMAN, MONT.—A new lighting system will be installed on Main street at a cost of about $14,737.

PUEBLO, COLO.—Arkansas Valley Automobile Co. is to build a garage, two stories, 68 x 120 feet.

STERLING, COLO. — Sterling Consolidated Electric Co. is in the market for a 250 kilowatt, 3-phase, 60-cycle, 2,200 volt generator and stokers for three boilers, H. L. Titus is manager.

PRESCOTT, ARIZ. — Arizona Power Co. has been given permission to issue $340,000 in bonds to enable it to add to its power plant on Fossil Creek, to supply a wider area with power.

PLEASANT GROVE, UTAH. — A $25,000 municipal electric light plant is being planned.

KELLOGG, IDA.—Guelph Mining Co. is to install an electric power plant, compressor plant, pumps, hoist and other machinery at its mine in Kellogg.

WALLACE, IDA.—Ben L. Collins, mana-

ger of the H. E. & M. mine, says that work will be started shortly on the construction of a new mill.

COLVILLE, WASH.—Stevens County Power & Light Co. has asked a franchise for conveying water from Colville river, to be used for generating electricity.

ELLENSBURG, WASH.—Contract for additions to the municipal lighting plant was awarded to W. A. Kramer & Co., Portland, Ore., at $59,000. Reuben Crimp is city clerk; F. M. Carter, city engineer.

PULLMAN, WASH.—L. H. Burnett, associated with the United States Gas Co., Seattle, has made application for a gas plant in Pullman, initial cost to be $75,000.

SEATTLE. — Council has authorized the construction of the $60,000 Salmon Bay bridge on Fifteenth avenue, northwest.

SEATTLE.—County commissioners will receive bids until 10 a. m., June 28 for the construction of a 209-foot, steel bridge across the Snoqualmie river, at an estimated cost $15,000.

LINNTON, ORE.—Shell Oil Co., of California, is to spend $500,000 for a warehouse, tanks, docks and reservoirs. Reitz & Story, Northern Bank & Trust Co., Seattle, Wash., is architect.

PORTLAND, ORE. — Portland Practical Heater Co. has been incorporated to manufacture heaters; $5,000 capital stock; by H. H. Pearce, Louis F. Lundburg and R. Steinberg.

PORTLAND, ORE. — Oregon-Washington Railroad & Navigation Co. will spend about $200,000 on divisional terminal facilities, 4 miles west of Pendleton. About $250,000 will be spent in completing the Coyote-Echo cut-off on the main line.

ROSEBURG, ORE.—This city has authorized a $300,000 bond issue for aiding Kendall Brothers of Pittsburgh, in constructing a line from Roseburg to a line of the Cascade National forest reserve on the Umpqua river, and the erection of a sawmill. The entire investment amounts to $1,250,000.

REDDING, CAL.—Field Process Co. is to enlarge its plant at Redding and engage in the manufacture of commercial products from its waste smelter smoke; about $30,000 will be expended.

SAN FRANCISCO.—Sequoia Saw Co. has been incorporated to manufacture saws; $25,000 capital stock; by W. R. Brown, W. W. Kergan and L. D. Byrne.

SAN FRANCISCO. — The board of state harbor commissioners will ask bids shortly on a viaduct, 285 feet long, 13-foot roadway, consisting of two 92-foot spans and two 50-foot spans, all of steel encased in concrete with reinforced concrete pile foundation.

SAN JOSE, CAL.—L. P. and H. C. Artana, 289 West Santa Clara street, is to build $12,000, 2-story machine shop.

SEASIDE, CAL.—W. H. Sheasby, Berkely, Cal., is interested in a proposed $500,000 steel plant to be erected at Seaside by the Western Fidelity Oil & Holding Co.

STOCKTON, CAL.—Engineering & Foundry Co., previously mentioned, has not yet bought equipment for its new plant. L. L. Miller is secretary.

TEHAMA, CAL.—Bonds of $10,000 have been voted for a municipal water works plant.

WATSONVILLE, CAL. — Bids will be asked shortly on a $35,000 460-foot reinforced concrete cantilever bridge.

WESTVILLE, CAL.—Plans are being made by the Herman Mine Co. for the installation of an electric plant.

ALASKA

CORDOVA, ALASKA.—It is reported that Falcon Joslyn and others will take over the Copper River & Northwestern railroad and later make extensions to several copper mines, as well as build branch lines to the Bering river coal fields.

New Trade Publications

NAILS.—The Youngstown Sheet & Tube Co., Youngstown, O., recently has issued two catalogs devoted to its line of cement coated nails, wire nails and other wire products. The catalogs form a complete record of the many different types of nails manufactured by the Sheet & Tube Co. and will be forwarded on request.

OIL-DRIVEN COMPRESSORS. — Instructions for installing and operating the fuel oil-driven compressors built by the Chicago Pneumatic Tool Co. are contained in a 24-page bulletin. All users of this equipment will find this bulletin of great value, as the instructions for installation and operation are unusually complete.

NUT LOCKS. — A folder describing its positive nut lock has been issued by Schum Bros., New York. It is claimed for this lock that none of the parts is exposed as they are protected by the nut. The nut lock comprises three parts, spring, movable section and set screw. Four broached places in the nut permit the locking of the nut on the bolt.

TURBO-PUMPS.—The Kerr Turbine Co., Wellsville, N. Y., has issued a bulletin describing and illustrating its line of steam turbine-driven pumps for water supply, boiler feeding, fire service, circulating condenser water, circulating water in heating systems, draining mines, etc. The bulletin contains 24 pages and is well illustrated. It will be forwarded on application.

GASOLINE ENGINES. — In the catalog recently issued by the Chicago Pneumatic Tool Co., Chicago, gas and gasoline engines built in six sizes and ranging in horsepower from 16 to 130, are illustrated and described. These are similar in general design to the fuel oil-driven engines built by this company with the exception that they are intended for operation with artificial or natural gas.

MOTOR-GENERATOR SETS—Bulletin No. 42552, entitled Motor-Generator Sets, has been issued by the General Electric Co., Schenectady, N. Y. It is an attractive publication of 28 pages, enclosed in a designed cover and containing numerous illustrations of various types of motor-generator sets designed and manufactured by the company. There is included a general description of this type of apparatus.

AIR COMPRESSORS.—Two catalogs recently issued by the Ingersoll-Rand Co., New York City, are devoted respectively to steam driven, single stage, straight line air compressors and the Leyner-Ingersoll water drill. The air compressor catalog is well illustrated and shows the details of the machine in section. Among the principal features of construction are the air valves in the air cylinder and the balanced piston steam valve with automatic cut-off control in the steam cylinder.

METAL LATH HAND BOOK. — The Trussed Concrete Steel Co., Detroit, has issued a comprehensive hand book on metal lath products including complete data on the special forms manufactured by this concern. The specifications and editorial matter in this edition have been completely revised and the hand book therefore is thoroughly up to date. Many new details have been added. The illustrations of typical installations are particularly comprehensive and include many new applications.

CIRCULAR STORAGE SYSTEM.—A four-page bulletin issued by the Link-Belt Co., Chicago, illustrates and describes its circular system for storing coal and similar materials with long radius locomotive cranes. One circular storage crane shown is steam-operated; it runs on 20-foot gage tracks, is equipped with a 3½-ton bucket and has a radius of 110 feet. The advantages of this system also are pointed out and numerous illustrations of various storage systems are included.

AUTOGENOUS WELDING. — A 48-page catalog issued by the Davis-Bournonville Co., Jersey City, N. J., devoted to autogenous welding, contains a comprehensive description of the collective gas exhibit at the Panama-Pacific International Exposition. Considerable space is devoted to the laying of pipe to serve the exposition gas lines which were welded with the apparatus made by this company. In addition, numerous service views are included showing the welding of pipe and pipe line cutting. The adaptability of this apparatus for outside work is pointed out in detail and various styles of this device also are shown.

DIRECT CURRENT COMMUTATING POLE MOTORS.—In a 16-page bulletin, issued by the General Electric Co., Schenectady, N. Y., its direct current commutating pole motors are illustrated and described. The frame of these machines is cast steel, of medium weight, with symmetrical section. The motors can be used with a sliding base which maintains a correct driving alignment and this, with the adjustable shields, permits the installation of the motor on either the floor, wall or ceiling. The motors also may be equipped with covers, rendering them semi-enclosed, totally enclosed or self-ventilated. They are wound for 115, 230 and 550 volts direct current circuits with a permissable voltage range of from 110 to 125, 220 to 250 and 500 to 600 volts.

RIVETERS.—An attractive 64-page catalog devoted principally to Hanna riveters has been issued by the Vulcan Engineering Sales Co., Chicago. These riveters are provided with a combination of toggles, levers and guide links. The mechanism is so adjusted that the toggle joint movement is utilized until a predetermined pressure is reached, after which a simple lever movement is employed through a considerable space under approximately maximum pressure. This space, it is said, is sufficient so that there need be no uncertainty about the pressure applied to the rivet. Consequently hydraulic results are claimed for a pneumatic riveter. The catalog includes illustrations and descriptions of many different forms and sizes of riveters together with considerable interesting data regarding riveting in general.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to July 1.)

Bessemer, valley	$13.65 to 13.75
Bessemer, Pittsburgh	14.60 to 14.70
Basic, Pittsburgh	13.60 to 13.75
Basic, eastern Pa.	13.75 to 14.00
Malleable, Pittsburgh	13.45 to 13.95
Malleable foundry, Chicago	13.00
Malleable foundry, Philadelphia	15.00 to 15.25
Malleable foundry, Buffalo	12.50 to 13.00
No. 1X foundry, Philadelphia	14.25 to 14.50
No. 2 foundry, Pittsburgh	13.45 to 13.95
No. 2 foundry, valley	12.50 to 13.00
No. 2 foundry, Cleveland	13.00
No. 2 foundry, Ironton	12.50 to 12.75
No. 2 foundry, Chicago	13.00
No. 2X foundry, Philadelphia	14.00 to 14.25
No. 2X fdy., N. J. tidewater	14.25 to 14.50
No. 2X foundry, Buffalo	12.50 to 13.00
No. 2 plain, Philadelphia	13.75 to 14.00
No. 2 plain, N. J. tidewater	14.00 to 14.25
No. 2 plain, Buffalo	12.25 to 12.50
No. 2 southern, Birmingham	9.50 to 10.00
No. 1 southern, Cincinnati	12.40 to 12.90
No. 2 southern, Chicago	13.50 to 14.00
No. 2 southern, Phila. delivery	14.00 to 14.25
No. 2 southern, Cleveland	13.50 to 14.00
No. 2 south'n, New York docks	13.75 to 14.00
No. 2 southern Boston, docks	13.75 to 14.00
No. 2 south. interior, New Eng.	14.50 to 15.50
No. 2 southern, St. Louis	12.90 to 13.40
Virginia No. 2X furnace	12.50 to 13.00
Virginia 2X, Philadelphia	15.25
Virginia 2X, Jersey City	15.50
Virginia 2X, Boston points	15.75
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.20
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Jackson, O.	14.75 to 15.25
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	20.00 to 21.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.25 to 16.25
Charcoal, Buffalo	15.75 to 17.00
Charcoal, Birmingham	21.00

IRON ORE

(Lake Superior Ores.)

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.45
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.80

FOREIGN ORES

(Per unit Philadelphia.)

(Prices nominal.)

Foreign Bess., 50 to 65 per cent	7c to 8¼c
For'n non-Bes., 50 to 65 per cent	7c to 8¼c

COKE

(At the ovens)

Connellsville furnace	$1.55 to 1.60
Connellsville fur. contr.	1.65 to 1.75
Connellsville foundry	2.00 to 2.40
Connellsville fdy. contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.25 to 2.50
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro mang. furnace (prompt)	$115
Ferro mang. Balti. (future)	$95.00 to 100.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent.	18.00 to 18.50
Ferro-sil., 11 to 12 per cent.	17.00 to 17.50
Ferro-sil., 10 to 11 per cent.	16.00 to 16.50
Ferro-sil., 9 to 10 per cent.	15.00 to 15.50

(Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville.)

Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open hearth billets, Phila.	$22.06 to 22.56
Forging billets, Phila.	24.56 to 25.06
Forging billets, Pbgh.	25.00 to 26.00

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.45
From Pittsburgh	.619
From Youngstown	.639
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Rates on sheet mill products $2 per ton higher.

Wire rods, Pittsburgh	$25.00 to 26.00
Billets, Pittsburgh	20.00 to 20.50
Billets, Youngstown	19.00 to 19.50
Sheet bars, Pittsburgh	20.50 to 21.00
Sheet bars, Youngstown	19.50 to 20.00
Muck bar, Pittsburgh	27.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs. Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbg. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chgo.	21.50 to 22.50
Angle bars, st. sect. Pbgh. base.	1.50c
Angle bars, st. sections, Chicago	1.50c
Spikes, railroad, Pbgh.	1.35c to 1.40c
Spikes, railroad, Chgo.	1.50c
Track bolts, Pbgh.	1.85c to 1.90c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	3.00
New England	3.00
Philadelphia	2.79
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago, to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c to 1.25c
Structural shapes, Chicago	1.39c to 1.44c
Structural shapes, Philadelphia	1.359c
Structural shapes, New York	1.369c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.34c to 1.44c
Tank plates, Pittsburgh	1.15c to 1.25c
Tank plates, Philadelphia	1.359c
Tank plates, New York	1.369c
Bars, soft steel, Pittsburgh	1.20c to 1.25c
Bars, soft steel, Chicago	1.39c to 1.44c
Bars, soft steel, Philadelphia	1.359c
Bars, soft steel, New York	1.369c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Bands, Pittsburgh	1.20c
Shafting, Pbgh., carload prompt	68 to 70 per cent off
Shafting, Pbgh., contr.	68 per cent off
Screw stks., Pgh. carl'ds,	68 to 70 per cent off
Bar iron, Chicago	1.15c to 1.20c
Bar iron, Philadelphia	1.175c to 1.225c
Bar iron, New York	1.15c to 1.20c
Bar iron, Cleveland	1.20c to 1.25c
Bar iron, Pittsburgh	1.25c
Hard steel bars, Chicago	1.20c to 1.25c
Smooth finish, mchy. steey, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.90c
No. 28, black, Chicago	1.89c to 1.94c
No. 28, tin mill, black, Pbgh.	1.85c to 1.90c
No. 28, galvanized, Pbgh. (nom.)	5.00c
No. 28, galvanized, Chgo., nom	
No. 10, blue, anld., Pbgh. nom.	1.35c
No. 10, blue, annealed, Phila.	1.459c to 1.509c
Tin plate, 100 lb., coke base	3.10c to 3.20c

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold rôll, and re-anl.	30 cents
Hot roll'd pickl'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ⅜ to 3 inches	79	63½
Iron, ⅜ to 2½ inches	71	52
	Lap-weld.	
Steel, 2½ to 6 inches	78	62½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	74
Iron, 3½ to 4½ inches l. c. l.	62

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nails jobbers, Pittsburgh	$1.55 to 1.60
Plain wire, jobbers, Pittsburgh	1.35 to 1.40
Galvanized wire, jobbers, Pbgh.	2.15 to 2.20
Polished staples, Pbgh.	1.55 to 1.60
Galvanized staples, Pbgh.	2.35 to 2.40
Barb wire, painted, jobbers, Pbgh.	1.55 to 1.60
Barb wire, galv., jobbers, Pbgh.	2.35 to 2.40

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ½ x 6 inches, smaller or shorter, rolled threads, 80 and 10; cut threads 80 and 5; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts ½ x 4 inches, smaller or shorter, rolled 80 and 15; cut, 80 and 10; larger or longer, 80.

Gimlet and cone point lag or coach screws, 85.

Hot pressed square, blank or tapped nuts. $6.40 off list; hot pressed hexagon blank or tapped, $7.30 off.

Cold pressed square, blank or tapped, $6.10 off; hexagon, blank or tapped, ½ inch and larger, $7.50; ⅜-inch and smaller, $8.00.

RIVETS

Structural rivets, Pbgh	1.50c
Structural rivets, Chgo	1.68c
Boiler rivets, Pbgh	1.60c
Boiler rivets, Chgo	1.78c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon.	Base price Cut to length	
	Hard.	Soft.
1½ inch and wider	2.85	3.10
0.100 and thicker	2.85	3.10
0.050 to 0.099 inc.	2.95	3.20
0.035 to 0.049 inc.	3.10	3.35
0.031 to 0.034 inc.	3.35	3.75
0.025 to 0.030 inc.	3.60	4.00
0.020 to 0.024 inc.	3.80	4.20
0.017 to 0.019 inc.	4.70	5.20
0.015 and 0.016	5.10	5.60
0.013 and 0.014	5.95	6.45
0.012	6.55	7.05
0.011	6.90	7.40
0.010	7.25	7.75
	Coils.	
0.100 and thicker	2.75	3.00
0.050 to 0.099 inc.	2.80	3.05
0.035 to 0.049 inc.	2.95	3.20
0.031 to 0.034 inc.	3.10	3.50
0.025 to 0.030 inc.	3.20	3.60
0.020 to 0.024 inc.	3.30	3.70
0.017 to 0.019 inc.	3.60	4.10
0.015 and 0.016	4.00	4.50
0.013 and 0.014	4.70	5.20
0.012	5.05	5.55
0.011	5.40	5.90
0.010	5.75	6.25

CAST IRON WATER PIPE

Six to 48-in., Cleveland	23.75
Four-inch, Chicago	25.50
Six to 12 inches, Chicago	23.50
Large sizes, Chgo	23.00
Six-inch, New York	20.50 to 21.50
Four-inch, New York	21.50 to 22.50
Four-inch, Birmingham	20.50
Six-inch and larger, Birmingham	18.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.80c
Steel bars, Philadelphia	1.70c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.55c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.70c
Shapes and plates, New York	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve	2.05c
No. 10 blue anl. sh. St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	2.00c
No. 28 black sheets, Chgo	2.45c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 galv. sheets, Chicago	4.85c to 5.00c
No. 28 galv. sheets, Cleveland	5.50c to 6.00c
No. 28 galv. sheets, Cincinnati	5.50c to 6.00c
No. 28 galv. sheets, St. Paul	5.50c to 6.00c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$ 8.75 to 9.25
No. 1 railroad wrought, Cleve	9.25 to 9.50
No. 1 railroad wrought, St. L	7.75 to 8.00
No. 1 railroad wrought, Cincin	7.50 to 8.00
No. 2 railroad wrought, Chgo	8.25 to 8.50
No. 2 railroad wrought, St. L	7.25 to 7.50
Arch bars and transoms, Chgo	12.00 to 12.50
Arch bars and transoms, St. L	10.50 to 11.00
Knuckles, coup. & spr'gs, Chgo	8.75 to 9.00
Knuckles, coup. & spr'gs, St. L	8.00 to 8.50
Shafting, Chicago	12.00 to 12.25
Shafting, St. Louis	10.50 to 11.00
Steel car axles, Chicago	10.00 to 10.25
Steel car axles, St. Louis	10.00 to 10.25
Locomotive tires, Chicago	8.50 to 9.00
Locomotive tires, St. Louis	8.75 to 9.00
Cut forge, Chicago	8.25 to 8.50
Pipes and flues, Chicago	6.25 to 6.75
Pipes and flues, Cleveland	7.25 to 8.00

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	61.9 cents

Pipes and flues, St. Louis	6.00 to 6.25
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	10.00
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	8.75 to 9.00
No. 1 busheling, Chicago	7.25 to 7.75
No. 1 busheling, Cleveland	8.50 to 8.75
No. 1 busheling, Cincinnati	6.00 to 6.50
No. 1 busheling, St. Louis	6.75 to 7.00
No. 2 busheling, Chicago	6.00 to 6.50
No. 1 boiler plate, cut, Chgo	5.50 to 5.75
No. 1 boiler plate, cut, St. L	5.25 to 5.50
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	5.25 to 5.50
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.75 to 5.25
Cast borings, St. Louis	5.25 to 5.50
Machine shop turnings, Chicago	5.00 to 5.50
Machine shop turnings, Cleve	5.75 to 6.00
Machine shop turnings, Cinci	$ 4.25 to 4.75
Machine shop turnings, St. L	5.50 to 5.75
Malleable agricultural, Chicago	7.50 to 7.75
Malleable agricultural, St. Louis	5.50 to 6.00
Malleable, railroad, Chicago	8.00 to 8.50
Malleable, railroad, Cincinnati	6.00 to 6.50
Malleable, railroad, St. Louis	6.25 to 6.50
Angle bars, iron, Chicago	11.75 to 12.25
Angle bars, iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chicago	8.25 to 8.50
Angle bars, steel, St. Louis	8.00 to 8.25
Stove plate, Chicago	7.75 to 8.00
Stove plate, Cleveland	8.00 to 8.25
Stove plate, Buffalo	8.25 to 8.75
Stove plate, Cincinnati	6.00 to 6.50
Stove plate, St. Louis	6.00 to 6.25
Bundled sheet, Cincinnati	4.75 to 5.25

(Gross tons.)

Heavy melting steel, Pbgh	$11.75
Heavy melting steel, Buffalo	10.50 to 11.00
Heavy melting steel, Chicago	9.50 to 9.75
Heavy melting steel, Cleveland	10.25 to 10.75
Heavy melting steel, Cincinnati	8.50 to 9.00
Heavy melting steel, eastern Pa.	11.00 to 11.50
Heavy melting steel, New York	8.50 to 9.00
Heavy melting steel, St. Louis	9.00 to 9.50
Grate bars, Buffalo	9.00 to 9.50
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	12.75 to 13.00
No. 1 railroad wrought, Pbgh	10.25
No. 1 R. R. wrght., New York	10.50 to 11.00
No. 1 R. R. wrought, Buffalo	10.50 to 11.00
Shafting, New York	13.00 to 13.50
Shafting, eastern Pa	15.00 to 15.50
Wrought pipe, New York	8.25 to 8.50
Wrought pipe, eastern Pa	10.50 to 10.75
Mch. shop turnings, New York	6.00 to 6.25
Machine shop turnings, Buffalo	5.75 to 6.25
Mch. shop turnings, Pbgh	8.00
Mch. shop turnings, eastern Pa	8.25 to 8.50
Cast borings, New York	6.00 to 6.25
Cast borings, eastern Pa	8.25 to 8.50
Cast borings, Buffalo	6.50 to 6.75
Cast borings, Pittsburgh	8.50 to 8.75
Stove plate, N. J. points	8.50 to 9.00
Stove plate, Pittsburgh	8.25 to 8.75
Stove plate, eastern Pa	9.00 to 9.50
Shoveling steel, Chicago	9.00 to 9.25
Shoveling steel, St. Louis	8.00 to 8.25
Reroll. rails, 5 ft. & ov., Pbgh	12.00 to 12.50
Reroll. rails, 5 ft. & ov., Chgo	10.00 to 10.50
Reroll. rails, 5 ft. & ov., Cleve	10.50 to 11.00
Reroll. rails, 5 ft. & ov., E. Pa	11.50 to 12.00
Reroll. rails, 5 ft. & ov., St. L	10.00 to 10.25
Steel rails, short, Chicago	10.00 to 10.50
Steel rails, short, Cleveland	11.75 to 12.00
Steel rails, short, St. Louis	9.25 to 9.50
Iron rails, Cleveland nom	11.75 to 12.00
Iron rails, Chgo	12.00 to 12.50
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, St. Louis	10.00 to 10.50
Iron rails, Pittsburgh (nom.)	12.50 to 13.00
Frogs, switches, guards, Chgo	9.50 to 9.75
Frogs, switches, guards, St. L	9.00 to 9.25
Car wheels, (iron), Pittsburgh	11.50
Car wheels, (steel), Pittsburgh	12.25 to 12.50
Car wheels, Chicago	10.00 to 10.25
Car wheels, eastern Pa	10.75 to 11.25
Car wheels, Buffalo	10.00 to 10.50
Car wheels, N. J. points	9.50 to 9.75
Car wheels, St. Louis	9.75 to 10.00
Iron axles, Pittsburgh	17.50
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa	18.50 to 19.00
Iron axles, Chicago	15.25 to 15.75
Iron axles, Buffalo	16.00 to 16.50
Iron axles, St. Louis	13.50 to 14.00
Steel car axles, New York	13.50 to 14.00
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.00 to 12.50
Steel car axles, eastern Pa	14.00 to 14.50
No. 1 busheling, Buffalo	8.50 to 9.00
No. 1 busheling, Pittsburgh	9.75 to 10.00
No. 2 busheling, Buffalo	6.50 to 7.00
Low phos. steel, Buffalo	12.50 to 13.00
Low phosphorus steel, Pbgh	15.00 to 15.25
Low phos. steel, eastern Pa	14.75 to 15.25
No. 1 forge, eastern Pa	8.50 to 9.00
No. 1 cast, eastern Pa	12.00 to 12.50
No. 1 cast, Pittsburgh	11.75 to 12.00
No. 1 heavy cast N. J. points	11.25 to 11.50
Mall. railroad, Cleveland	10.25 to 10.50
Malleable railroad, Pittsburgh	10.00
Malleable railroad, Buffalo	9.50 to 10.00
Malleable railroad, east Pa	9.25 to 9.75
Bundled sheet, Pittsburgh	9.00
Bundled sheet, Cleveland (nom.)	8.50 to 9.00
Bundled sheet, Buffalo	7.00 to 7.50

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Penton's Book News

Penton Building Cleveland, Ohio

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How New Forge Plant is Equipped

(*Continued from page* 1254)

formers, connected delta. All of the lights are controlled by two panel boxes. The lights are 30 feet above floor level and 25 feet above platform level. They are spaced on 30-foot centers on the sides and 29.5-foot centers across the shop. The lights are 250-watt tungsten, provided with 1-foot concave reflectors.

In tests made to determine the amount of illumination secured at a point 2 feet above the floor level, it was found that the illumination directly underneath each light was 1.6 foot-candles. At the corners of the 30-foot squares, it was 1.4 foot-candles and between the corners 1.88 foot-candles. Tests conducted at a point 2 feet above platform level, showed the illumination directly underneath the lamps to be 1.72 foot-candles; at the corners of the 30-foot squares, 1.63 foot-candles, and between the corners, 2.08 foot-candles.

The two panel boxes for controlling the lights contain three-phase busbars. Single-phase lines are taken off alternately from one bar to another to balance the line. Five lamps are located on each line. All of the lighting wires are carried in conduits on the roof trusses.

The power current is used at 440 volts and is carried in conduits, in tunnels under the platforms. There is a separate cut-out box for each motor. The motor starters are provided with overload and no-voltage release. All motors are of the squirrel cage, induction type, 440 volts, 3-phase, 60-cycles. As stated previously, each machine is provided with individual motor drive, the capacities of the motors ranging from one to 35 horsepower. All of the motors are set close to the machines, permitting the use of short belts but providing an arc of belt contact on the small pulley sufficient to drive the machine by means of a belt-tightener and idler pulley with spring tension. The arrangement of belt and idler pulley is shown in Fig. 1.

The motors for driving the continuous hot headers are of the shifting armature, variable speed type, equipped with magnetic starter, overload and no-voltage release and push button control. They operate on direct current. The buttons are at the operator's end of the machine, providing a convenient control for starting and stopping. The cranes also operate on direct current, 250 volts.

Provisions for the comfort and welfare of the workmen are exceptionally complete. An emergency hospital is located on the first floor of the office building, with a nurse in constant attendance. It is provided with the usual first-aid equipment. The wash rooms are of large size and are provided with both hot and cold water. All drinking water used about the plant is sterilized and cooled. A number of bubbling fountains are located about the shop.

Adjoining the hospital, is a large chemical laboratory where five chemists work continuously, testing all the materials used in the process of manufacture.

The office building, as stated previously, is six stories high and is of steel and concrete construction. All of the air used in ventilating the building is drawn through water by a suction fan and thoroughly cleansed and cooled. A forced ventilating system is used throughout the building. Refrigerating equipment is installed to furnish cold water and cool air in the summer time, and to preserve the kitchen supplies. The heat for the office building is controlled by regulators installed by the Powers Regulating Co., Chicago. The basement also contains the switchboards and electrical equipment for lighting and ventilating the office building.

The first floor is used for the storage of heavy stores,

such as pipe, cables and tool steel. The second floor is used for general stores. A card index system is used for keeping a record of the thousands of pieces stored in this department. These cards furnish a continuous stock record, as they show at all times the quantity on hand. An unique feature is a photograph at the end of each aisle, showing the stores carried in that aisle.

The third floor is arranged for the storage of patterns, of which an accurate record is also kept by means of cards. The drafting room and the engineering and operating officials' offices are located on the fourth floor; the general and executive offices on the fifth and sixth floors.

Chromic Iron Ore in California

California has a large number of deposits of chromic iron ore and is the chief native source of chromium in the United States. Although the metal chromium occurs in a number of minerals, chromic iron ore (chromite) is practically the only ore mined as a source of chromium. Its production in America is increasing, especially since the war has in large measure cut off the foreign supply. In 1913 the output of chromite sold in the United States was 255 long tons, valued at $2,854, but in 1914 the output was 591 long tons, sold for $8,715, a gain of 131 per cent in quantity and 205 per cent in value as compared with the production in 1913.

All of it came from one mine in California except a small amount of chrome sand washed from stream beds near Baltimore.

Chromite has a wide range of uses. Its difficult fusibility, at 2,180 degrees Cent., fits it for lining furnaces. It yields strong colors, especially green and yellow, and much of it is used in the manufacture of pigments, dyes and various chemical compounds, as well as for tanning leather, to which it imparts softness and durability. As chromium gives to steel a marked degree of hardness it is largely used in the manufacture of steel for armor plate and armor-piercing projectiles, as well as for making high-speed tools. For this purpose it is generally alloyed with nickel, vanadium, or manganese.

The American markets have been supplied almost wholly by imported chromite, but according to J. S. Diller, of the United States geological survey, the rapidly growing uses and demands for it, with increasing facilities for transportation, should lead to the greater development of American deposits.

Output of Mineral Paints

Statistics compiled by J. M. Hill and just made public by the United States geological survey show a greater production of mineral paints during 1914 than in 1913. This increase is particularly marked in the white pigments made from both lead and zinc.

In 1914 there were 66,566 short tons of domestic ocher, umber, sienna, mineral paint, mortar color, and ground slate and shale sold, which was less by 4,029 tons than the sales of similar pigments in 1913. The output of white pigments—zinc oxide, leaded zinc, and the basic sulphate of lead produced by sublimation showed an increase of 10 per cent in value over 1913. During 1914 there were sold 106,791 short tons of these pigments for $9,978,710.

The lead pigments made chemically, including basic carbonate white lead, litharge red lead, and orange mineral, and the chemically prepared zinc barytes pigment lithopone likewise showed a decided increase; 245,206 short tons of these pigments were sold in 1914, for $27,621,829.

High-Grade Tin and Terne Plates
Genuine Charcoal and Iron Terne Plates
The Carnahan Tin Plate & Sheet Company
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Specialties → Blued and Polished Steel, Deep Drawing Steel, Automobile Sheets, Full Finished Enameling and Ceiling Stock, Etc.

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CHAPMAN ENGINEERING COMPANY, Mt. Vernon, Ohio
1323 Oliver Bldg., Pittsburgh 11 Broadway, New York

Malleable Iron CASTINGS
Of HIGH TENSILE STRENGTH and EXCEEDINGLY TOUGH *Large or small*, we are equipped to make your castings, and guarantee complete satisfaction It is our business to serve you. Quick delivery our specialty *Write us*
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Opportunities

Men Wanted
Minimum, 50 words, $1.00. Each additional word, 2c. All capitals, 50 words, $1.50. Each additional word, 3c.

Position Wanted
Minimum, 25 words, 50c. Each additional word, 2c. All capitals, 25 words, 75c. Each additional word, 3c.

Miscellaneous Classified
Minimum, 25 words, $1.00. Each additional word, 4c. All capitals, 25 words, $2.00. Each additional word, 8c.

Remittance should be made to cover eight (8) words for address if box number is used.

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Men Wanted

HELP WANTED:—SALESMAN ON 40 per cent commission basis to handle new $6 boring tool which sells on sight. Address Box 446, THE IRON TRADE REVIEW, Cleveland, O.

WANTED:—A-1 FOREMAN FOR GRAY iron foundry in middle west doing railroad work; open shop; must be a hustler; state age, experience and references, also salary wanted. Address Box 461, THE IRON TRADE REVIEW, Cleveland, O.

UNDERSIGNED COUNSEL WILL CONfidentially negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $3,000 to $12,000 men. Send address only for explanation. R. W. Bixby, F1 Niagara Square, Buffalo, N. Y.

THE BEST WAY TO GET A GOOD POsition in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

Positions Wanted

WANTED: — POSITION AS FOUNDRY superintendent or foreman; 22 years as foundry foreman in gray iron, brass, semi-steel and cupola; up to date on machinery molding and general foundry work; sober and dependable with A-1 references. Address Box 455, THE IRON TRADE REVIEW, Cleveland, O.

OPERATING SUPERINTENDENT AND efficiency executive of crucible, electric and open hearth steel plants and rolling mills, fully qualified by seventeen years successful plant management experience, desires position wherein practical metallurgical, producing, economic, statistical and financial experience are required. Address Box 409, THE IRON TRADE REVIEW, Cleveland, O.

MECHANICAL ENGINEER; TECHNIcal training; 18 years' experience gas engines, machine tools, mill buildings, hydraulic machinery, ordnance work; 14 years in charge of work; 6 years as superintendent; can fill position of superintendent or chief engineer; good references. Address Box 341, THE IRON TRADE REVIEW, Cleveland, O.

BLAST FURNACE SUPERINTENDENT who can produce results wishes position. Preferably with company manufacturing Bessemer or Basic for own steel plant. References furnished. Address Box 441, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED — BY MECHANical engineer having 20 years experience as a machinist, tool-die maker, general metal manufacturing line, also drafting, thoroughly understands systematizing so as to get the highest efficiency at the minimum cost. Age 35. At present holding executive position. Address Box 450, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

FOUNDRY FOREMAN, HAVING BEEN in business and knowing the foundry business from the bottom up is looking for a position; up-to-date on cupolas, molding machines and economical production. Address Box 432, THE IRON TRADE REVIEW, Cleveland, O.

STEEL FOUNDRY FOREMAN, 15 years' experience in open hearth, converter and manganese steel castings, both green and dry sand. Address Box 333, THE IRON TRADE REVIEW, Cleveland, O.

EXPERIENCED PATTERN MAKER wishes position as foreman; over 10 years in charge of shops employing from 20 to 100 men making patterns for gas and oil engines and electrical machinery. Broad experience with molding machines. Address Box 253, THE IRON TRADE REVIEW, Cleveland, O.

STEEL FOUNDRY SUPERINTENDENT or general foreman; young man of unquestioned ability and character would like to connect with a firm offering a future. Address Box 434, THE IRON TRADE REVIEW, Cleveland, O.

STEEL FOUNDRY SUPERINTENDENCY by aggressive, competent man; crucible, electric or open hearth plants preferred. Expert knowledge of mixtures, melting, molding, casting and cost. Savings effected; refinements introduced. Address Box 410, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED—BY MECHANICal engineer having 22 years experience as a mechanic in the steel line, thoroughly understand the heat treatment of Alloy, Carbon and High Speed Steels. At present employed as mechanical engineer, desires position in the Steel or Machinery line. Address Box 451, THE IRON TRADE REVIEW, Cleveland, O.

GRADUATED MECHANICAL ENGINEER, 32 years, with 3 years shop experience and 8 years as designer in car work, rolling mill and steel plant work, desires position as assistant master mechanic or assistant mechanical engineer, in taking care of repair work, or smaller engineering office. At present employed in Pittsburgh district. Best of ability and character references furnished. Address Box 438, THE IRON TRADE REVIEW, Cleveland, O.

EXECUTIVE

15 years manufacturing experience; 4 years under F. W. Taylor at Bethlehem Steel. Experienced in all departments, shop, design, office and management. Not merely a system man but a practical experienced organizer, sure of results if proposition is undertaken. Have organized several plants that were not making proper returns and have demonstrated results that were unusual. Have turned bad losses into profits the first year. Can get and fill contracts for war material if machinery is suitable. Will only consider proposition of some size that is financially sound. Have clean past record. Technical graduate. Address Box 447, THE IRON TRADE REVIEW, Cleveland, O.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman or any technical (Est. 21 years) 1662 Monadnock Block, Chiman, consult The Engineering Agency, Inc., cago.

Positions Wanted

IRON METALLURGIST, CHEMIST, metallographist, 8 years iron and steel experience, desires foundry position in charge of cupolas, efficiency and safety work. Successful executive with initiative ability; now handling 40 men on a scientific management basis. Married; age 36. Location middle west or south. Address Box 457, THE IRON TRADE REVIEW, Cleveland, O.

Wanted

WANTED: — SECOND-HAND DELANO or equal, pulley molding machine for pulleys 38 to 48-inch, inclusive; also one pulley turning lathe for either 20 to 30-inch pulleys. Both of the above machines to be in first-class condition and at a reasonable price. Address Box 458, THE IRON TRADE REVIEW, Cleveland, O.

Sales Agents

WE HAVE BEEN ESTABLISHED FOR YEARS IN PRESENT LOCATION WITH OFFICES IN LEADING BUILDING, MICHIGAN AVENUE, CHICAGO; DOING BUSINESS WITH ALL RAILROADS AND PRINCIPAL MANUFACTURERS CONSUMING IRON AND STEEL PRODUCTS. MANUFACTURERS DESIRING REPRESENTATION IN THIS DISTRICT WOULD FIND IT TO THEIR INTEREST TO COMMUNICATE WITH US, UPON COMMISSION OR SALARY BASIS. HIGHEST REFERENCES. ADDRESS BOX 462, THE IRON TRADE REVIEW, CHICAGO, ILL.

Sites

NOTICE TO MANUFACTURERS.

The Butler Land & Improvement Co., of East Butler, Pa., have a number of the most beautiful manufacturing sites, that they will give free of charge to good reliable Manufacturers who will locate on same, they have cheap fuel, both coal and natural gas, very low taxes, ideal homes for workmen at low rents, they have already located three large plants, and quite a number of splendid sites for others. If you are looking for a manufacturing site write them for information.

FACTORY OR WAREHOUSE PROPERTY for rent, can give two and a half or seven and a half year lease, on very low rental basis. Building 70 x 120, three floors and cement basement. Contains steam engine and two elevators. Building stands alone having light on four sides. Can be approached by two streets and two alleys, equipped with sprinkler system. Building was occupied before by factory, has lockers and toilet on each floor and other factory equipment therein. Weil & Co., 87 Michigan Ave., Detroit, Mich.

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